MAR 22 1940

TELEPHONE ENGINEER

Management Engineering Maintenance

MARCH 1940

Decision on Learner Minimum Wage Delayed . . . Central Office Equipment Planning . . . Short Course on Telephone Transmission . . . Sales Stimulants . . . Noise Suppressor Invented

Announcing Fortnightly TELEPHONE ENGINEER

REACHING EVERY INDEPENDENT TELEPHONE COMPANY IN THE UNITED STATES

With a Controlled Circulation in Excess of

8,600

EVERY ISSUE

THE only advertising medium reaching EVERY Independent Telephone Company in the United States EVERY month . . .

TO be published on the first day of every month starting July 1, next . . . and not to be confused with the regular issue of Telephone Engineer which will continue to be published on the 15th of each month as it has been for the past 31 years . . . In other words "Fortnightly" Telephone Engineer on the first, Telephone Engineer on the 15th . . . thus serving the telephone men twice monthly instead of just once as heretofore.

Here it is . . . .
A Nation-Wide Circulation to Independant Telephone Companies . . . .

Hi-Lights OF THE EDITORIAL CONTENT

Editorials crusading for guiding and control of fair and equitable legislation and toward correcting such conditions as are harmful to the Independent telephone business; Spot news aud views of the telephone world including Special, Exclusive Washington Coverage; Items of new products and activities of manufacturers and suppliers; "Heard on the party line" or keeping up with the activities, travels and doings of telephone personalities . . . and articles for the operating telephone man written in plain everyday, non-technical, understandable English.

Telephone Engineer Rate Cards can be used in figuring advertising rates. . . . The same rates to be charged in both issues.

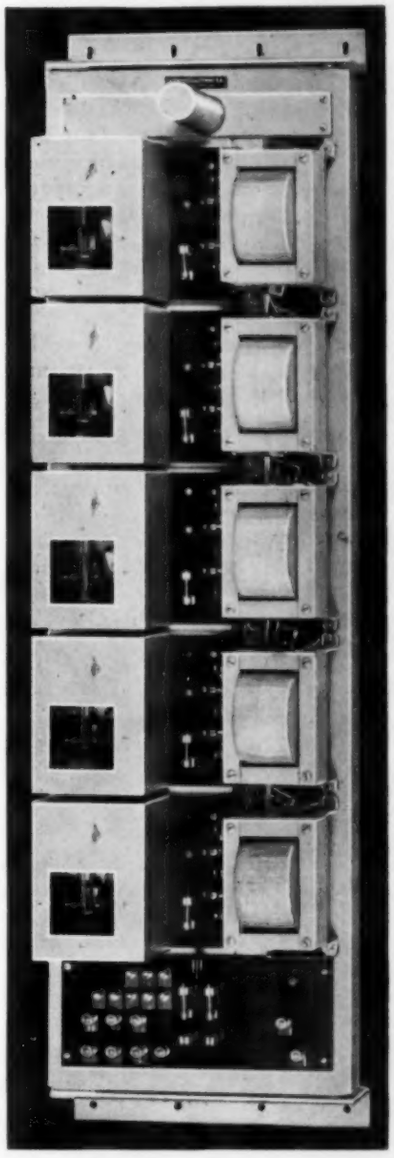
SPACE ORDERS ARE NOW BEING ACCEPTED FOR THE FIRST ISSUE, JULY 1, 1940

For further information write or call - - - - ROGERS PARK 3040

TELEPHONE ENGINEER - 7720 Sheridan Road - Chicago, Ill.

LEICH — First Name *for* HARMONIC RINGING

For more than thirty years, Leich Electric Company has been a leading manufacturer of ringing equipment for the telephone industry. During this period, more than ten thousand Leich ringing machines have been placed in service in all parts of the world and as a result, Leich engineers have gained an unequalled knowledge of ringing problems and their solution.



Leich leadership in this field is exemplified by the new Leich Harmonic Converters which incorporate all desirable features for both manual and automatic exchanges. They provide five-frequency alternating ringing current with highly satisfactory wave forms under varying loads tor all frequencies. They do not interfere with radio reception and are arranged for operation from the exchange battery or separate ringing battery, as preferred. Duplicate vibrators with automatic cut-in feature insure uninterrupted service.

Telephone engineers are cordially invited to place their ringing problems before the Leich technical staff. Complete details and figures on ringing equipment for specific installations will be furnished without obligation. Write to:

LEICH SALES CORPORATION

427 W. RANDOLPH STREET., CHICAGO, ILLINOIS

ACROSS THE Editor's Desk

The announcement on our inside front cover—turn back one page—might not explain in detail our inner thoughts and feelings on changing our former policy of coming to you once each month. To us, and we mean the entire staff, it means double duty. But this cannot compare with the exciting feeling that soon we will be addressing over 8000 readers—some of them entire strangers to us.

▼

To you it will mean the appearance of new writers, and new material to assist you in doing a better job. To the industry it will mean that a mouthpiece to address the COMPLETE Independent field has been born. To its new readers it will mean that the efforts of the editorial staff will do its best to bring you a telephone publication second to none—one that will aid you and keep you informed on all phases of your business.

▼

To suppliers and manufacturers this announcement means they will finally be able to address the entire Independent field in a publication that is Independent in thought, both editorially and financially.

▼

And last, it means to us a fulfillment of our dreams to one day have EVERY Independent telephone company in the U. S. as a reader of TELEPHONE ENGINEER. The First copy of Fortnightly TELEPHONE ENGINEER will be mailed on July 1.

TELEPHONE ENGINEER

MANAGEMENT • ENGINEERING • MAINTENANCE

Vol. 44, No. 3 **March, 1940**

CONTENTS

- Across the Editor's Desk 4
- A Short Course in Telephone Transmission By B. C. Burden 15
- "Tapping In" on Washington By Roland C. Davies 17
- Central Office Equipment Planning By Ray Blain 19
- Conducting a Sales Campaign By Atwell Jackson 21
- Convention Dates 22
- New Stromberg-Carlson Officials 26
- Line & Desk—By Ray Blain 28
- Long Lines—By R. A. Clark, Jr. 30
- "I Wonder Why Someone Doesn't Invent" By "Quizzicus" 36
- It's Odd but True 38
- Noise Suppressor Invented by B. L. Fisher 39
- Index to Advertisers 46

Published Monthly by

Telephone Engineer Publishing Company

A Magazine devoted to the interests of the entire telephone industry—operating men and manufacturers.

SERVING THE FIVE BILLION DOLLAR TELEPHONE INDUSTRY

Founded in 1909

Office of Publication, Pontiac, Illinois. Executive and Editorial Offices 7720 Sheridan Road, Chicago, Illinois. Phone Rogers Park 3040. J. A. SMITH, President and Treasurer; RAY W. SMITH, Vice-President and Editor. Subscriptions: U. S., Cuba, Mexico, $1.00 Per Year; Canada, $1.50; In all Other Countries, $3.00. Single Copies, U. S. A., 15 cents. All Subscriptions should be sent DIRECT to 7720 Sheridan Road. Entered as Second-Class Matter at the Post Office at Pontiac, Illinois. Under the Act of March 3, 1879.

Short Course in Telephone Transmission

By
B. C. BURDEN

Subject—Telephone Repeaters

Repeater Maintenance Notes

REPEATERS require more careful supervision and skilled maintenance than do most other items of central office apparatus. Periodic **transmission tests** are required to insure that the repeater is working at the desired efficiency. So called "singing point tests" are made as a check on the line and network impedance balance. Occasional **cross-talk** and **noise tests** are required to insure that the repeater itself is not contributing to crosstalk or noise. The following paragraphs discuss some of the tests necessary in repeater maintenance.

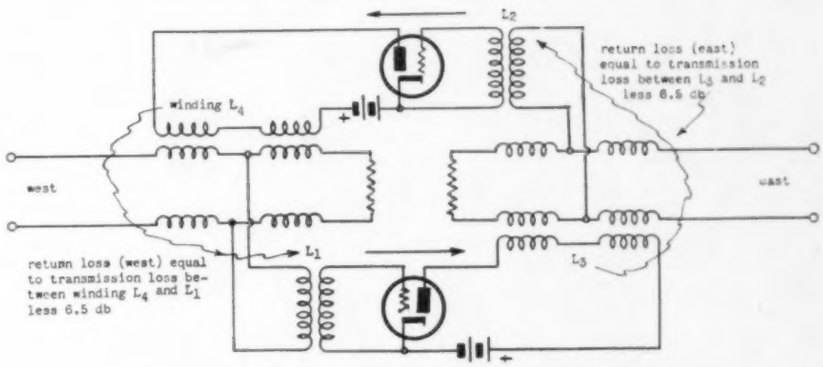

L2
return loss (east) equal to transmission loss between L3 and L2 less 6.5 db
winding L4
west
east
L1
L3
return loss (west) equal to transmission loss between winding L4 and L1 less 6.5 db

Figure 1.—Sketch illustrating significance of term "return loss".

Effect of Unbalance

One of the most important of the several tests that are conducted on repeaters is the determination of a repeaters "singing point." As was pointed out in an early article of this series, a repeater in order to operate on a two-way basis requires a three winding transformer used in conjunction with a balancing network and connected to the amplifier and line in such way that the output energy does not feed back to the input circuit thereby causing oscillation or "singing" in the repeater.

In the ideal case with a perfectly balanced transformer and with line and network impedances exactly equal to each other none of the output energy from the repeater would be reimpressed on the input circuit. Practically, however, a repeater does not have such a perfect degree of balance, hence there is a well defined limit to the amount of gain that can be inserted in a line by a repeater. The effect of the departure of the line impedance from the balancing network impedance in terms of "singing point" is expressed in decibels.

The term **singing point** in recent years has been changed to **return loss** as this term is somewhat more significant.

Figure 1 attempts to show what is meant by the term **return loss.** This figure shows that the return loss is equal to the transmission loss (in decibels) between winding L4 and wdg. L1 less 6.5 db in the case of the west side of the repeater and to the loss between winding L3 and L2 less 6.5 db in the case of the east terminal. The 6.5 db represents the 50% loss in energy that takes place at both the input and output circuit of the repeater due to the division of energy plus 0.5 db in the transformer itself. The return loss (singing point) increases as the length (loss of circuit connected to the repeater increases. In other words, a short toll circuit will have a lower return loss than a long toll circuit under the same conditions of balance. This is understandable, as the unbalance currents must travel to the distant irregularity and then back to the repeater before being reimpressed on the input circuit. The term "return loss" is descriptive of this fact.

The maximum gain which any repeater can give is equal to the return loss in each direction divided by 2. Because of distortion which occurs when a repeater is worked close to the singing point, it is usually the practice to set the working gain of the repeater about 5 to 7 decibels lower than the actual return loss.

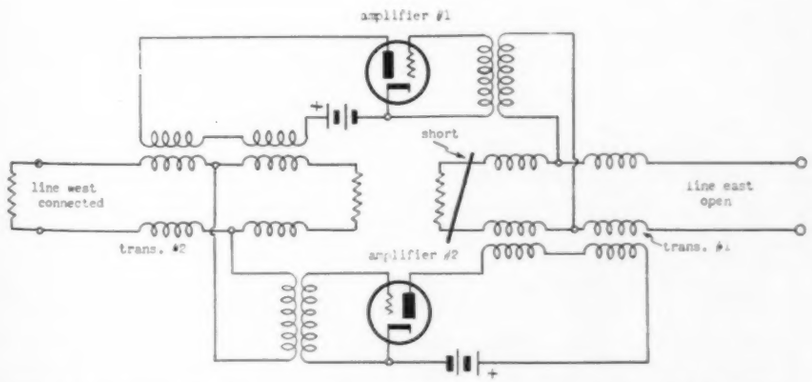


Figure 2.—Connections for making "singing point" test on east terminal of a repeater.

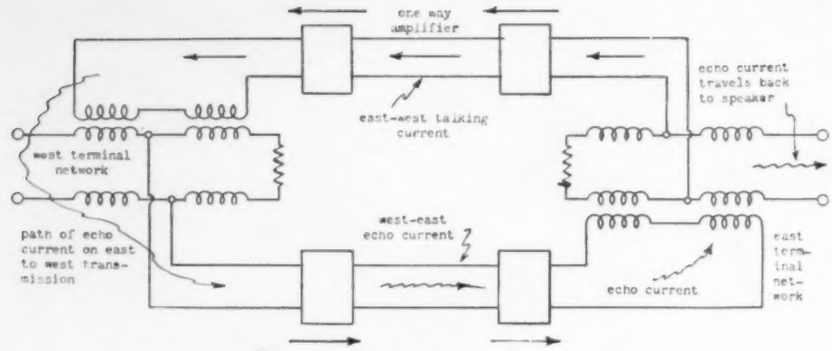

one way amplifier
echo current travels back to speaker
east-west talking current
west terminal network
path of echo current on east to west transmission
west-east echo current
east terminal network
echo current

Figure 3.—Schematic showing how an echo can occur on a four wire toll line.

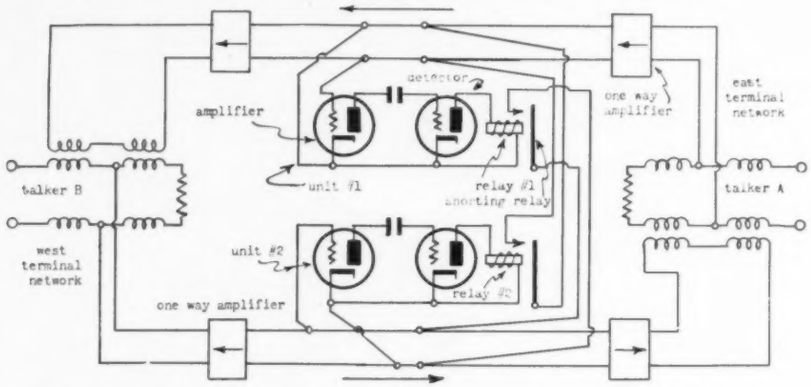


Figure 4.—Schematic of echo suppressor arrangement on long wire toll circuit.

Singing Point Measurements

TELEPHONE companies operating a number of repeaters make periodic tests to determine the return loss at the singing frequency. These measurements are generally referred to as 21 tests inasmuch as they involve opening the line and shorting the network terminals of the three winding transformer of the terminal under test. This results in the repeater operating very much like the early 21 type repeater. Figure 2 illustrates schematically the connections for making a 21 type test.

It will be seen that with the east network terminals shorted and line terminals open this transformer acts as a simple two winding transformer which will transfer energy from the plate circuit of amplifying element No. 2 into the grid circuit of amplifier No. 1. Transformer No. 2 is not disturbed, hence, acts in the normal manner. With the connections as shown the gain controls on the amplifiers are increased until the repeater begins to sing. The return loss is then equal to the gain in db of the two amplifiers less 6.5 db. In making this test it is customary to interchange the short and open on transformer No. 1 in order to check the gain at the singing point first under the arrangement as shown in Figure 2, and second with the short on the line terminals, and the network terminals open. The connections which give the lowest return loss is taken as the singing point. This is referred to as "poling the connections.'

As was previously stated with the return loss at the singing point determined then the repeater gain must be set at least 5 to 6 db below this value for satisfactory operation.

Echo Suppressors

ONE of the technical problems successfully solved by the Bell Telephone System on this long distance cross country four wire toll circuits was the suppression of "echo effects" which while not a problem on Independent Telephone Company short toll circuits is I believe of sufficient interest to justify a discussion of this interesting phenomena. (See Fig. 3). The term echo effects refers to the reflection of the talking currents from the listening end of a four wire circuit back to the talker. Because of the finite time required for the electrical current to travel over a long distance circuit voice currents which are reflected from the distant end of the line because of an impedance irregularity reach the talker's ear a noticable interval after the originating speech is impressed on the transmitter and these returning currents sound like an echo which is very disturbing to the talker. Echo effects are of course minimized by accurate impedance matching, however, it is necessary on the long four wire circuits to also use what is known as an **echo suppressor.** The echo suppressor consists essentially of two amplifiers, detectors and relays arranged in a circuit as shown in Figure 4. The amplifiers are bridged across the east-west and west-east lines and the corresponding relays are each arranged so that when operated they short the line over which the echo currents would return to the talker. The echo suppressor is usually installed near the mid-point of the circuit.

Operation is as follows: Voice currents from the talker A travel over the east-west line to the distant listener. At the point where amplifier No. 1 is encountered a small voltage is developed across the input to this amplifier and this voltage is amplified and then converted into direct current by the action of the detector (rectifier) tube. The direct current passing through relay No. 1 causes it to operate which shorts the west-east line thus preventing echo currents from traveling back to talker A's telephone. When talker A stops speaking relay No. 1 falls back releasing the short. The reverse operation takes place when talker B speaks, in this case amplifier and relay No. 2 coming into operation.

The relays must be arranged so that they pull up relatively fast and release relatively slow in order to prevent unsatisfactory operation. Echo suppressors are designed to be particularly efficient at 1000 cycles so as to respond readily to the average voice frequency, and to have minimum sensitivity to low frequency power noises.

THANK YOU!

PUBLIC UTILITIES FORTNIGHTLY in its issue of February 15, 1940, quoted an excerpt from an editorial in Telephone Engineer in its section devoted to "Remarkable Remarks" in which it cites notable statements by members of Congress, leading public officials, and newspapers and magazines.

The excerpt from the editorial of Telephone Engineer was quoted as follows:

"Too many times the press representing industry is prone to criticize or oppose governmental regulatory rules and orders which it deems highly detrimental to the industry it represents, perhaps without giving due credit to governmental commissions for actions which give practical, needed and deserved relief to the industry."

"Tapping In"

On Washington

By ROLAND C. DAVIES
Editor
Telecommunications Reports

THE Wage-Hour Division now is not likely to issue its decision on the application of the United States Independent Telephone Association for a minimum wage exemption for learner telephone operators until the latter part of March.

Although the decision had been once formulated in final form, it was determined by the Wage-Hour authorities to revise its context rather drastically so its issuance has been delayed for over a month. During the early part of March the decision was understood to be in the final stages of review by the Wage-Hour economists and attorneys to ascertain the precedents and authorities as well as the drafting of the opinion, although it was reported the conclusions of the finding had been determined. According to some views, the delay in the issuance of the decision and the known determination of Col. Philip B. Fleming, the new Wage-Hour Division Administrator, to be entirely fair in his actions were thought to augur that the telephone industry might receive some favorable consideration in its plea regarding the student operator situation.

On the whole, the Washington front has been quiet for the telephone industry during the past month and early March. The FCC has done little in the telephone field other than the launching of its first interstate telephone rate case on the Pacific Coast. (See another section of this column for a report on these hearings.) In April it is planned to have a survey made of technological unemployment in the telephone industry in which the effect of the dial service upon operators' employment will be analyzed before the Temporary National Economic Committee.

THE FCC embarked upon a hearing on the plans for frequency modulation of broadcasting during the middle of March which is a subject of indirect interest to the telephone industry because of the aspect of a new form of broadcasting and, more important, its possibilities in the radio relaying of broadcast programs instead of by the present method of telephone wires. Television was given a near-green light by FCC to go into public service by the Commission's approval of limited commercialization of televised programs and in the division of television stations into two classes—one for technical research and the other to develop program technique.

National Association Spring Conference

Plans for the program of the Executives Spring Conference of the U. S. Independent Telephone Association to be held in the Steven Hotel, Chicago, May 1 and 2, are now in the process of being completed, according to Louis Pitcher, executive vice president.

This Conference is strictly a two-day business session for executives with no manufacturers exhibits. President J. F. O'Connell, Madison, Wis., will preside at the sessions. Speakers already selected include leading authorities on their subjects.

Make your plans NOW to attend.

FCC Starts First Telephone Rate Proceeding; Recessed To April 1

THE issue of discrimination was a major point of the first telephone rate proceeding of the FCC—the investigation into the Pacific Telephone and Telegraph Co., interstate toll rates throughout its five-state territory—at March 2, but the inquiry was broadits San Fancisco hearings, Feb. 29 to ened with the injection of other subjects, including depreciation, Western Electric profits, rate of return and the financial relationships of the Bell System.

The hearing, over which FCC Commissioner Paul A. Walker presided, was recessed as a result of the broader issues until April 1, when it will be resumed in San Francisco for the cross-examination of the FCC witnesses and submission of rebuttal testimony by the Pacific Telephone and Telegraph Co. Exhibits by the Pacific Company were to be submitted to the FCC by the middle of March if possible.

Commissioner Walker was joined in the hearings by four state commissioners, Wakefield of California, Garrison of Washington State, Bean of Oregon, and Wattabaugh of Idaho. At the three-day session, FCC Assistant Chief Accountant Hugo Reyer and Manfred Toeppen, FCC Valuation Section Chief, were the witnesses for the Commission, while Frank Warren was the FCC Counsel. The Nevada Commission was not represented on the bench at the proceedings.

The Pacific Telephone & Telegraph Co. which was represented at the proceeding by Fletcher Rockwood as its counsel, indicated that it would show the higher toll rate differential of its

company in the various rate comparisons were attributable to higher per mile installation and maintenance costs because of the sparsity of population, topography of the territory in the Pacific Coast states, lower local exchange rates and other factors. The Pacific company declared that its interstate rate schedules were the same as the A. T. & T. for the shorter mile and were lower for the longer hauls outside of its territory.

The high points of the FCC officials' testimony included the following:

1. In the discrimination showing it was brought out the Pacific Telephone toll setup of not having Long Lines circuits in its territory was unique in Bell System and the Pacific Company's toll circuits were used both for interstate and intrastate traffic. The separation studies, prepared by the Pacific company, were a FCC target as being erratic, especially in their division of toll revenues between northern and southern California and in the allocation of expenses upon the basis of use of facilities which ignored the different revenue levels of the various classes of traffic. The prorate basis on tolls division by states within the Pacific Company also was noted.

2. The idea that a depreciation reserve greater than actual depreciation represented a "concealed surplus" and that the Bell System companies do not maintain uniform rates of depreciation accrual but keep changing them. By a computation of the depreciation accrual rate and rate of return a FCC witness alleged the Pacific Company had earned in 1938 two per cent more than a 6% return.

3. The telephone industry did not have the risks of other industries so its rate of return did not have to be so high the FCC averred. A comparison was made between the return of utility securities and the 1.1% rate of government bonds. Research in diminishing obsolescence risks, the uniform accounting, personnel policies and pension plans and maintenance and replacement policies all had tended to lower the risks of losses. The claim was made that the Long Lines rate of return was 8% and the return on joint Pacific-Long Lines traffic was 3% to the Pacific Company.

4. The 1927 sale of telephone instruments by A. T. & T. was depicted as having left a $1,500,000 write-up in the Pacific Company plant investment. Western Electric's cost accounting system was assailed as not sound and not in accord with the NEMA system so the effect of Western Electric profits on the Bell companies' plant costs could not be computed. Western Electric's $70,000,000 depreciation reserve was pictured as containing some of a concealed surplus.

5. A hint as to the outcome of the pending FCC decision on the plan of the seven Bell System companies to increase their pension accrual rates to meet actuarial liability was given by FCC Assistant Chief Accountant Reyer. of the actuarial liability was not accrued liability the increased accruals should not be charged to operating expenses but should come out of surplus and if the present liability was accrued liability the accrual increase should have started in 1927 when the actuarial liability occurred. The high pensions to retire Bell System executives was also criticised.

A showing of discrimination because of the higher levels of the Pacific Telephone interstate toll rates in comparison with the schedule of the A. T. & T. Long Lines constituted the only testimony at a brief half-day hearing in Seattle upon the complaint against these charges by the Washington State Department of Public Service. Commissioner Walker and the three leading officials of the Washington Department presided at the session.

A trio of witnesses were presented by Carl I. Wheat, special counsel for the Washington Department and former FCC Telephone Rate and Research Counsel. Two of the witnesses—the department rate engineer and a University of Washington professor—offered exhibits showing actual comparisons of the rates with the Pacific Company charges being higher than the Long Lines schedules both in the case of equal distances and similar routes and in examples of longer A. T. & T. mileage. The differentials cited showed the Pacific rates as from 11 per cent to 30 per cent, even in one case 43 per cent, more than the Long Lines charges. A spokesman for the user, a motor truck fleet operator, registered his complaint about the rate differences.

* * *

THE FCC hearing on the "Qualified Toll Service," involving extra charges

(Please turn to page 32)

TEXAS ASSOCIATION WILL START ROUND OF STATE CONVENTIONS

OSCAR BURTON

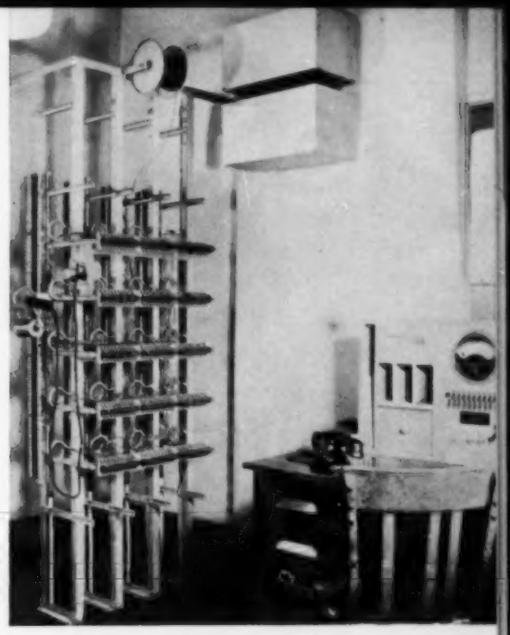
ON MARCH 19, 20 and 21, the Texas Telephone Association will hold its annual conclave at San Antonio at the Plaza Hotel. In rapid succession the conventions of Oklahoma, Kansas, Nebraska and Iowa will follow. Unusually large attendance is predicted as topics to be discussed will be handled by prominent men of the industry, especially picked for the occasion.

To Texas and its energetic president, Oscar Burton of Tyler, and able secretary, George Butler, goes the palm for innovations to make their meeting of interest to everyone. Holding their convention in historic old San Antonio, the site of the Alamo, they have also planned a "Convention Special" which is a special train for a short trip to Monterey, deep in old Mexico. Special low rates and a well planned itinerary will result in a most enjoyable short trip—Monterey is overnight from San Antonio and is at the foot of the beautiful Sierra Madre mountains.

A special honor has been bestowed on Oscar Burton in his election to the presidency of the Texas Good Roads Association recently. That association has done a valuable piece of work during the past few years and has important tasks ahead of it. To act as spearhead of popular opposition to diversion of gasoline tax revenue to other highway purposes is one of its most important jobs. This new recognition of the leader of Texas Telephone Association is indeed a credit to the industry.

Central Office Equipment Planning

By
RAY BLAIN



Small type main frame installed in the corner of th terminal room. Note holder for soldering iron, pil light and reel for jumper wire. Test unit built special cabinet and map on cable system on w above test desk.

WHEN any central office installation has reached a stage of depreciation where its maintenance costs are excessive, replacement should be considered. When the old equipment is local battery, then its replacement by common battery, or dial should be investigated. We do not intend to infer that any particular kind or type of equipment is best suited for any type of exchange as it is believed that all kinds are necessary to meet various conditions in different sections of the country. While it is true that the use of local battery is definitely on the decrease, there are still some localities where it may be used to advantage. By the same token common battery, manual, may prove the most desirable in one exchange and automatic in another, depending on the nature of local conditions. When the replacement of any central office equipment is being considered, the advantages of the various types should be carefully investigated.

Selection of Equipment

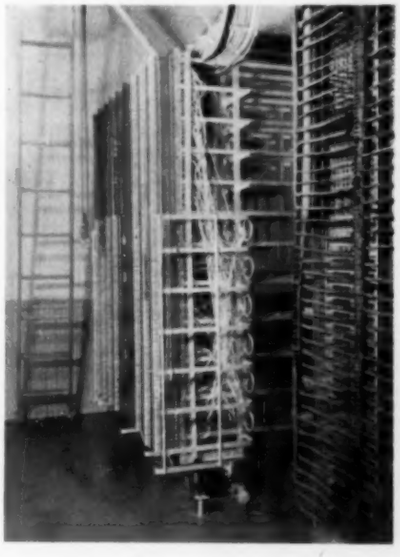
Manufacturers will be willing to furnish detailed information on the various types of equipment they can supply. When automatic equipment is selected, the various types should also receive proper consideration. Automatic installations are more or less tailor made for each exchange and no attempt will be made in this article to describe the equipment in detail. For average manual installations, certain rules always apply and in most cases should be observed in order to provide a satisfactory exchange. The aim of this article is an attempt to cover these rules briefly in the hope that they may be of some assistance to those who may be contemplating a change in their central office equipment.

When local battery equipment is selected there is not much choice as to the kind to use, although such installations are usually of the non-multiple type. Lamp type supervisory signals with a current supply furnished by suitable apparatus from the commercial power supply are now often used to advantage. Common battery signaling with local battery talking is also occasionally used on small magneto systems.

WHERE common battery equipment is selected, a decision should be made as to the type of switchboard which best meets all requirements. The rural and toll lines are usually terminated on a special position which is equipped with universal cord circuits. Non-multiple common battery switchboards are usually not over two positions and of one or two hundred lines. A switchboard larger than this should in most cases be of the multiple type. When a multiple type switchboard is used, the multiple is generally arranged on either a four or a six panel basis. Each position on this type of switchboard of about 1200 lines or smaller should ordinarily be of the multiple answering jack type, as this arrangement permits the traffic load to be automatically distributed among the various operators on duty. Larger switchboards are usually of the separate answering jack type in order that the load each operator is supposed to handle may be adjusted by changing the number of active answering jacks on the position.

Some telephone companies may prefer to make use of a special feature switch-

RIGHT—The protector side of main frame and rear view of relay rack.



LEFT — A multiple type switchboard of 1200 lines. This is the multiple type answering jack type sometimes called the associated answering type jack.

Same one position common battery switchboard.

board equipped with automatic machine ringing, operators cut-in, operators-bar, advance plugging-in, audible busy test and various other features which are available for use with this type of equipment. While this special feature switchboard costs more than the conventional type equipment it is likewise more efficient and reduces the operating cost considerably. These facts should all be carefully considered when attempting to prove-in this type of equipment for any exchange.

The Switchboard Room

The switchboard should in all cases be located in a dry, well-lighted and ventilated room. This room should preferably be located on the second floor of a building as this places it above the surface dirt and is less bothered by street noises. Windows should be located so that light does not strike the face of the switchboard in such a manner as to cause reflection and glare. Neither should the switchboards be located so that artificial light must be used on clear days. Ceilings should be treated acoustically and floors should have a suitable covering similiar to battleship linoleum. The walls should be covered with a good grade of light colored paint and venetian blinds provided for all windows. Room lighting should be adequate and of the non-glare type.

The Terminal Room

THE terminal room location on the first floor is preferable and basements should be avoided in all cases. This room should be of sufficient size to acommodate the necessary equipment without crowding and provide adequate space for a reasonable future growth. The cable vault should be of a sufficient size to accommodate all cables entering the exchange and provide adequate space for the splicing of the paper insulated cables to smaller silk and cotton insulated cables which extend to the main frame. The cable vault is ordinarily best located in the basement directly beneath the main frame. On a manual system, the terminal room usually contains besides the main frame, the relay rack, power panel, ringing and charging machines, storage batteries and test desk. Good lighting is most essential for this room and numerous wall sockets should be arranged so that ample facilities will be available for the use of extension lights and electric soldering irons. Rolling ladders suspended from a ceiling track prove desirable for the main frame and relay racks in the larger exchanges. A good portable step ladder will usually prove adequate for the smaller exchange. Linoleum floor covering and venetian blinds for the windows are also highly desirable in any terminal room.

Power panel lined-up with relay rack and main frame. One rolling ladder serves all.

The Main Frame

On large manual systems the main frame ordinarily accommodates 200 pairs of protectors per vertical and on the smaller type systems only 100 pairs per vertical. A wall type main frame is often preferred for the smaller systems as they require less floor space for installation and are convenient to use. The floor mounting type main frame should be well braced at the top with angle iron. The entire frame including all bracing should be covered with two or more coats of good grade aluminum paint. Black paint should never be used on main frames.

On underground cable systems, heat coil and open space cut-outs are normally considered adequate central office protection for the outside lines. However, on aerial distribution systems, a fuse should be added. On small systems using a wall type main frame, the fuse is ordinarily combined with the protector and on larger systems the fuse rack is usually of the wall mounting type and separate from the main frame.

THE oustide cable pairs usually terminate on the main frame at the protectors which is known as B-type protection. On the associated answering jack switchboard, no intermediate distributing frame is required and on some of the smaller separate answering jack type of switchboards a combination IDF and MDF is used. On large answering jack switchboards a separate IDF must be used so that the load may be properly distributed among the various positions. The terminal blocks on the horizontal side of the main frame should be arranged to present a neat appearance and to facilitate the running of jumpers.

It is generally the best practice to have jumper wire reels permanently mounted on the main frame, a good heat insulated soldering iron holder and an outlet for attaching the soldering iron to the commercial power is also desirable. A switch and a pilot light for controlling the heating of the iron is also a desirable convenience. A small four-compartment tray mounted on the main frame provides a most convenient arrangement for keeping protector parts near at hand and convenient for use at all times. A loop on one end of this box is also most convenient as a holder for heat coil pliers so that they may always be located quickly.

(Please turn to page 37)

Conducting a Sales Campaign

Atwell Jackson

By ATWELL JACKSON
Sales Consultant
for TELEPHONE ENGINEER

FOLLOWING my article in a recent issue, "Sales Stimulants for More Business," there have been several readers writing in to me for details of various phases of a sales program. So rather than treat these inquiries as specific questions, the editor and myself concluded that an article, on selling telephones, would answer for both the actual and anticipated questions.

In any sales program in which I have participated my first move has always been to establish an objective. Specifically, what is the purpose of the campaign? While it is true that the purpose of all campaigns of this nature is to increase business, that definition, at best, is nebulous. When however, a company sets about to increase business by first the determination of a definite objective, then working toward that goal, the chances for success are increased.

The meaning of this is simple. Suppose you have one thousand subscribers; and you set upon the increase of business to add 5% additional subscribers or additional stations within a period of 90 days. Then that is your end in view—and once the end in view is established, the means to an end become more important, for as we progress along our line of the means to an end, and if we follow our original plans in that direction, the end in view usually takes care of itself.

NOW, after that **end in view,** or your objective, has been established the first step of development toward the means to an end is to determine where your new business will originate. There are but two sources from which to get additional business, (1) present customers, (2) new customers. Let us start with present customers. Sell these customers **your** institution and keep them satisfied. There are some splendid examples of institutional promotional work produced by the larger telephone companies which I believe are at your disposal in this connection. These pieces could be sent to your present subscribers with regularity, to cultivate an increase in appreciation of both the telephone and your service. While you may never sell the present subscriber an extension line or a second station, you must realize fully that there are possibilities from time to time of a possible cancellation, and anything which will fortify against this discontinuance of service is good selling. That is, or should be, your first line of defense, TO KEEP YOUR PRESENT CUSTOMERS SATISFIED AND CONTENTED WITH THEIR SERVICE. It is, of course, believed by the writer that your physical service to your subscribers is up to par and I'll not go into that. But there are many plus services which you can call to their attention which would help in keeping them further satisfied, and at the same time offer to you, through this satisfaction an ever widening influence of good-will.

To divert just for a short time, I have often thought that the rural telephone companies could give a splendid service, especially to the farmer by advising him on weather bureau reports and almanac information. Look at the tremendous success that some of the radio stations have made by catering to information for the farmer, and out of this service you will get some fine ideas to offer to your present customers that will further the making of your service indespensible.

New Accounts

Now let us look at the second step, **getting new accounts.** Further planning of this as a means to an end, my first step would be to make some sort of a study of my territory. Undoubtedly you know much of the surface information of your locality, but do you know specifically enough of the community to make a highly selective selling campaign. Your local newspaper, or your state or county farm paper will have all of the necessary statistics whereby you can find out the various classifications of industry, per capita earning power, and other vital facts that relate to the localities in which you serve. To approach a possible subscriber with a specific message pertaining to their specific domestic or business problem will net you a more encouraging reaction than if you went for it with nothing more than the typical "canned music" talk. Whatever your community indicates in the way of telephone user habits, you will find many examples among your present subsribers to build up a story for presentation. For instance if your community is one of single crop farmers, you should have splendid confirmation material on hand from other single crop farmers, who face similar conditions, that you can relate to your prospective subscriber and by having made a thorough analysis of your situation before you tackle the job of selling to your prospect—you have a bull's eye to shoot at with hard solid shot, rather than the cut-and-dried method of scatter-shooting hoping to hit something.

UNDOUBTEDLY you have a complete, properly indexed list of your subscribers—BUT DO YOU HAVE AN AVAILABLE, PROPERLY INDEXED LIST OF YOUR POSSIBLE NEW SUBSCRIBERS. This is the first step toward actual solicitation for an expension program. Then when this list has been obtained, broken down into classifications that will enable the specific selling program outlined above —THEN LAY OUT YOUR CALLS TO MAKE A SPECIFIC NUMBER OF CALLS EACH DAY AND SET UP A REASONABLE QUOTA FOR NEW BUSINESS EACH DAY. Putting up a quota on a monthly, or annual basis is a fine thing—but too often we fall short. To break down your quotas to do a specific selling job each day creates an automatic check that registers the progress of your program.

THE AUTHOR

Atwell Jackson will analyze your sales problem if you will address him care of TELEPHONE ENGINEER. There is no charge for this service. Mr. Jackson, nationally known sales engineer is brought to you exclusively in these columns.

That determines whether you are moving along as you planned or whether you are being delayed for one reason or another. If you are held up, you have the opportunity of finding out "why" when you can do something about it.

No matter how large or how small the company, whether a single exchange, or many exchanges, the same fundamentals apply. For it is not the size of the company that dictates its fundamental sales policies—it is the company itself—for success of expansion will always follow a high quality of service and selective solicitation. A program such as herein suggested also applies whether you have a high priced sales director to whom you can delegate these responsibiltiies; or whether you do the job of selling, maintainance and engineering all rolled into one. It applies whether you have a highly specialized sales organization, or whether it falls upon part time selling of your employees. For in the final analysis this program is suggested to those willing to use the resources at their disposal to the highest degree possible to use them.

So in view of that circumstance if the selling falls only on two people, one should be in authority. One person should be responsible for the conduct of the program and seeing that the plans are carried out properly—for the best laid plans in the world might look good on paper, if nothing is done about it—they are worthless.

However to the one responsible for the supervision and direction of the sales program there are many simple little methods, (systems if you care to call it that) which will aid in getting a firmer grip on the situation. There should be some sort of a sales report. Whether this is a printed form, or whether it is merely a typed report, it should be of a nature that it tells the complete history, of the call. THE INFORMATION REVEALED BY INTELLIGENTLY FILLED IN SALES REPORTS CAN BE AN INFALLIBLE COMPASS OF FUTURE SELLING ACTIVITY. What goes on the sales report is vital—BUT MORE VITAL IS WHAT IS DONE ABOUT WHAT IS ON THE SALES REPORT.

Whether the report is, as I said printed or just a typed report it should contain some vital information among which should always be, (1) Name of person interviewed, (2) Their position with the company or in the home, (3) Location and other data on address, (4) Results of call, (5) What type of follow up if any, (6) When next call is to be made and what is to be done in the meantime, (7) Intimate knowledge of the situation that either made the sale or lost it (this is vital to govern future solicitations and presentations to avoid making similar mistakes if sale is lost or to build up on those points which "clicked"), (8)—If necessary space should be provided on the report, or the use of the back, to work out specific data in the event that quotation must be given or personal letter must be written. This information is all **must** material on the report, because it gives to the sales supervisor a complete case history of the call and enables guidance for further follow-up to either get the order, or lose it.

TERRITORY should be properly assigned to those most logically suited to handle it. It should be selected and assigned in order to enable the greatest number of calls within the shortest space of time—AND DO NOT OVERLOOK THAT WHEN YOU OR ANY OF YOUR REPRESENTATIVES ARE MAKING NEW CALLS, **ALWAYS CALL ON YOUR PRESENT SUBSCRIBERS IN THE VICINITY AS A GOOD WILL GESTURE.**

Now in summary, I believe that if you want to expand you should, (1) pick a definite objective, (2) select the proper number of employees to do the job and properly train them to represent you in obtaining this objective, (3) establish quotas with an automatic check that you can keep abreast from day to day of your progress, (4) have a satisfactory type of selling report that will enable proper control, (5) always bear in mind that you have a sales job where one class of users are apt to subscribe for reasons different than other users. FIND THESE REASONS AND PLUG AWAY ON A HIGHLY SELECTIVE SELLING PROGRAM.

CONVENTION DATES

Texas Telephone Association, Plaza Hotel, San Antonio, March 19, 20 and 21.

Oklahoma Telephone Association, Mayo Hotel, Tulsa, March 27 and 28.

Kansas Telephone Association, Hotel Kansan, Topeka, April 3 and 4.

Nebraska Telephone Association, Hotel Fort Kearney, Kearney, April 9 and 10.

Iowa Independent Telephone Association, Fort Des Moines Hotel, Des Moines, April 16, 17 and 18.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 23 and 24.

United States Independent Telephone Association, Spring Conference, Stevens Hotel, Chicago, May 1 and 2.

Indiana Telephone Association, Claypool Hotel, Indianapolis, May 8 and 9.

Pennsylvania Independent Telephone Association, Yorktowne, Hotel, York, May 16 and 17.

Wisconsin State Telephone Association, Park Hotel, Madison, May 22 and 23.

The Illinois Telephone Association, Hotel Pere Marquette, Peoria, May 28 and 29.

New York State Telephone Association, Hotel Syracuse, Syracuse, June 5 and 6.

California Independent Telephone Association, Miramar Hotel, Santa Monica, June 20 and 21.

Oregon Independent Telephone Association and Washington Independent Telephone Association, Gorge Hotel, Hood River, Ore., Joint Meeting, June 28 and 29.

FLASH—

Toll Rates Reduced

As we go to press we are informed the FCC has just announced that ATT long distance toll rate has been ordered reduced for an estimated total of $5,500,000.00 per year.

Reduced rates will be effective on or about May 1 and will apply to messages in excess of 420 miles. The Commission announced that this reduction had been achieved through informal negotiation between the Commission and the company.

Complete Owosso Trade

Owosso, Feb. 15.—W. J. Melchers, president of the Union Telephone company which has its general offices here, said Wednesday that the company's decision to buy up the majority of the stock in the Tri-County Telephone company, approved this week by the public service commission, would in no way affect operation of the Union company.

The Union company now operates exchanges in central and northern Michigan. The Tri-County company operates exchanges in Lenawee, Van Buren and Alpena counties, covering a wide territory. The Tri-County company is the outgrowth of a merger of three companies several years ago.

Tomorrow's ... Technique

THE Independent Telephone industry has never lost sight of this truth. As a result it can today point with pride to over half a century of healthy growth.

The Independent operating companies have realized that they must look to the Independent manufacturers for research and development of improved technique. The manufacturers have recognized this equally, and that they must depend on the Independent operating companies for support and counsel as to changing needs in the field.

Without this mutual cooperation the Independent industry would not today exist.

Over the decades the total contribution in dollars and brains has been enormous. It is reflected clearly in the swift and continuous advance of the industry since its earliest days. Every company, whether operating or manufacturing has played its part.

Automatic Electric Company gives full credit to the splendid technical contributions made by the other independent manufacturers and also takes pride in having contributed its own generous share to the continuous challenge for improvement. Over past years our expenditure on research and development has totaled many millions of dollars.

We believe today equally that this is the only way we in the Independent industry can intelligently ensure a sound and progressive future. Accordingly, we are today spending 4% out of every dollar of our sales on research and development to enable us to continue our contribution to the future advancement of the telephone art.

AUTOMATIC ELECTRIC

MAKERS OF TELEPHONE, SIGNALING AND COMMUNICATION APPARATUS
ELECTRICAL ENGINEERS, DESIGNERS AND CONSULTANTS

Distributors in U. S. and Possessions:
AMERICAN AUTOMATIC ELECTRIC SALES COMPANY, 1033 W. Van Buren St., Chicago, U. S. A.
Export Distributors: AUTOMATIC ELECTRIC SALES COMPANY, LIMITED

Stromberg-Carlson Announces Promotion of Officials in Organization

Dr. Ray H. Manson Becomes Vice President and General Manager to Succeed the Late George A. Scoville

CHANGES in the Stromberg-Carlson Telephone Manufacturing Company organization, based on action taken at a meeting of the Board of Directors held February 14th, have been announced by President Wesley M. Angle. Succeeding the late George A. Scoville as Vice President and General Manager is Ray H. Manson. After graduating from the University of Maine, which a few years ago conferred on him the honorary degree of Doctor of Engineering, Dr. Manson entered the telephone manufacturing field and was successively employed by the Western Electric, Kellogg Switchboard and Supply and Dean Electric companies. In 1916 he became associated with the Stromberg-Carlson Company as Chief Engineer and he has for some time been a member of the Board and the Vice President in charge of Engineering. Dr. Manson is the inventor of important telephone and radio patents, a past president of the Institute of Radio Engineers and prominent on various radio and television technical committees.

Dr. Ray H. Manson

Ralph Barger

Assisting Dr. Manson as Secretary and Assistant General Manager will be Lee McCanne. Mr. McCanne worked for the Company during his vacations and likewise entered its service immediately upon graduating from the Massachusetts Institute of Technology, serving successively in both the Engineering and the Sales Departments. He has been Secretary and Radio Sales Manager during the last five years.

Edward A. Hanover continues as Vice President in charge of Production and will also retain responsibility for the Company's broadcasting activities, Stromberg-Carlson Station WHAM, and its new companion frequency modulation Station, W8XVB, being under his general supervision. Mr. Hanover entered the employ of Stromberg-Carlson Telephone Manufacturing Company in 1901 when it was located in Chicago, was the Purchasing Agent for many years and has for some time been a Director and officer of the Company. George E. Eyer is General Superintendent and William Fay manages the broadcast stations.

Edwin C. Roworth has been with Stromberg-Carlson from the time he entered its service as office boy in 1905. For a number of years he has been Treasurer, and now becomes Vice President in charge of Finance.

Wilbur W. Hetzel, himself with the Company since he started in its factory in 1906 and recently Assistant Treasurer and Auditor, succeeds Mr. Roworth as Treasurer. Arthur F. Gibson becomes Assistant Treasurer in charge of Credits and Office Manager, and Gordon G. Hoit the Assistant Treasurer in charge of Accounting.

LLOYD L. SPENCER will continue his present duties as General Sales Manager and has likewise been nominated to succeed Mr. Scoville as President and Director of Stromberg-Carlson Telephone Manufacturing Company of Canada Limited, with headquarters at Toronto. Formerly Sales Manager of the Stromberg-Carlson distributing organization in New York City, Mr. Spencer came to Rochester to direct the Company's telephone and radio sales in 1937. Among other promotions in the sales force are Fred N. Anibal to be Radio Sales Manager. Ralph Barger, a veteran of Stromberg-Carlson's telephone sales and engineering departments, has been made Telephone Sales Manager of the Stromberg-Carl-

son Telephone Mfg. Co. He fills the position left vacant by the late Ben Woodbury.

From his 29 years of service with Stromberg-Carlson, Mr. Barger brings to his new responsibilities a wealth of practical experience in both sales and engineering of telephone equipment.

His entire career has been spent in the telephone industry with Stromberg-Carlson. Starting out at the bottom, he progressed steadily through varied positions that have given him a valuable phase of telephone work.

Fred C. Young, another of the men who worked for Stromberg-Carlson during vacations and joined the organization permanently upon graduation, has been with it since leaving Rensselaer Polytechnic Institute in 1922 and has lately been acting as Manager of Engineering. He now becomes Chief Engineer and succeeds Dr. Manson in active charge of Stromberg-Carlson's engineering forces.

Sidney R. Curtis also spent a summer vacation working in the factory and then on graduating from Yale in 1925 became a regular employee. For some years he has been Purchasing Agent, which position he will continue to hold, and he has likewise now been named Assistant Secretary.

A. F. Bennett Made Director

MR. A. FRANK BENNETT, Manager of Automatic Telephone and Electric Co., Ltd., Liverpool has been made a Director of the Company. After having served many years as a telephone engineer in the United States, Mr. Bennett joined the Automatic Telephone Manufacturing Co. Ltd., (as the Company was then known) in 1920, as Chief Engineer and was created Manager in 1939. His career has been marked by a number of spectacular achievements notably the restoration of telephone service in the City of Buffalo, N. Y., in a remarkably short time after a disastrous fire had destroyed the City's main exchange and the conducting of the negotiations with the British Post Office in 1922 which led to the latter adopting the Strowger Automatic Telephone System as standard for London and throughout Great Britain.

In similar negotiations with the authorities of other countries, Mr. Bennett has travelled extensively in all parts of the world particularly in Poland and Lithuania where great schemes of national reconstruction were in progress until interrupted by the outbreak of the present war. He also figured prominently in the development of the All-Electric Totalisator and its adoption for British Racegoers.

"Pot o' Gold" Gets Pot Shots

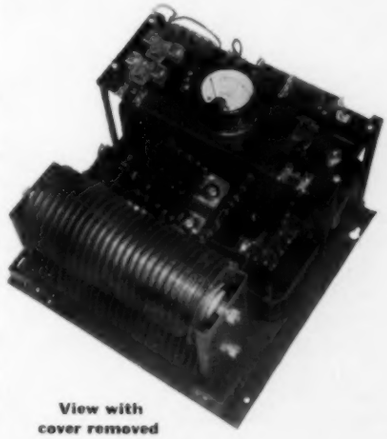
Albany, N. Y., Feb. 29—The harassing fire directed against the "Pot of Gold" broadcast of Lewis-Howe Company, Kansas City, for Tums, became more intensive this week as Station WDAF, Kansas City, refused to carry the program hereafter, and a local carpenter took steps to prosecute a suit recently filed. The Kansas City Star operates WDAF.

The carpenter, Cornelius C. Dumont, seeks $900 from Tums for alleged negligence. He received $100 when his number was called and the telephone went unanswered, and the $900 represents the difference between that sum and the $1,000 which is awarded when the winner is at home.

It all started, the carpenter's suit alleges, when his telephone number was changed from 4-6097 to 8-3451. The master of ceremonies in charge of the program, he reckons, got hold of an old telephone book, and thus Mr. Dumont's telephone never actually rang, though he was at home waiting. He charges that this was gross carelessness and demands his $900.

(Editors Note) The FCC has turned over to the Department of Justice complaints on the "Pot o' Gold" program for such action as may be necessary and warranted.

Frying transmitters, incorrect ringing, short battery life and other operating headaches often trace back to overvoltage caused by overcharging. When this is the case you can cure the trouble permanently with a Raytheon RectiChargeR.



View with cover removed

A RectiChargeR with a small storage battery floating across its terminals makes a complete, automatic AC-DC constant voltage telephone power unit. Dry disc copper-oxide rectifying units are used with other components that are equally long lived and free from maintenance.

RAYTHEON MANUFACTURING CO.
134 WILLOW STREET, WALTHAM, MASS.

LINE and DESK

RAY BLAIN, Editor

Q. What type of warning signal is considered best for use when openings in the street must be guarded during the construction of underground conduit systems?

A. Various types of such signals are now on the market which may be purchased at small cost and do a good job. We prefer the folding stand type which supports a sign and one or more danger flags. These may be obtained with three or four legs which may be spread wide to prevent the stand blowing over in a high wind. Suitable barricades which consist of folding steel legs which clamp on 2x4 or 2x6 timbers may also be obtained at small cost and prove quite useful in guarding all street openings. Suitable lights may also be clamped onto these guards for night use.

Q. What type of kettle is recommended for the heating of insulating compound?

A. We would recommend the use of a special three gallon kettle for this purpose. It is constructed of heavy steel, welded with an extra heavy bottom insert about 1-inch from the base. A double flue arrangement extends through the kettle bottom and up and out the sides for the purpose of conducting the heat to every part of the compound and insuring uniform melting and eliminating all danger of explosion. A short spout prevents clogging and permits free pouring. The large kettle opening provides ease in filling and cleaning.

Q. Occasionally we are required to attach two riser pipes to one pole and have always experienced difficulty attaching the cleats on the separate pipes. We have also tried several methods of lashing the pipes to the pole though this method has not proved satisfactory. What method do you recommend?

A. A special clamp, constructed of rather heavy metal is now available which may be placed over the two riser pipes and lagged in place. Often when two U-guards instead of riser pipes are used they may be separated sufficiently to permit the use of separate cleats or pipe straps. Ordinarily we would prefer to use the U-guards in preference to the riser pipes.

Q. Please advise where we may obtain carbon disc and granules for use in the repair of telephone transmitters. Also what method and instruments may be used to test repaired transmitters before placing them in service to make sure that they will provide satisfactory transmission?

A. We do not recommend the local repair of telephone transmitters by the average Independent Telephone Company. Several large companies have tried this and practically all of them have found that it is far more economical to return defective transmitters to their manufacturer for repair. Instruments to properly test a telephone transmitter are rather expensive and would not prove a worthwhile investment for the average telephone company in view of the small saving possible by the local repair of transmitters.

Q. What type of bridging connector is considered best for present day general telephone work?

A. In our opinion all bridging connectors now being sold by reliable manufacturers and jobbers may be considered satisfactory. At one time in the past such connectors got into disfavor due to their being so small that they did not permit enough pressure to be placed on the point of contact of the line and tap wire. Also due to the fact that dissimilar wires when connected often caused noise trouble. Present day bridging connectors are of a size which permit necessary pressure and spacers of different metals permit the trouble free connection of various kinds of wire.

Q. What type of saw may be used to best advantage for splitting lead sleeves for cable splicing?

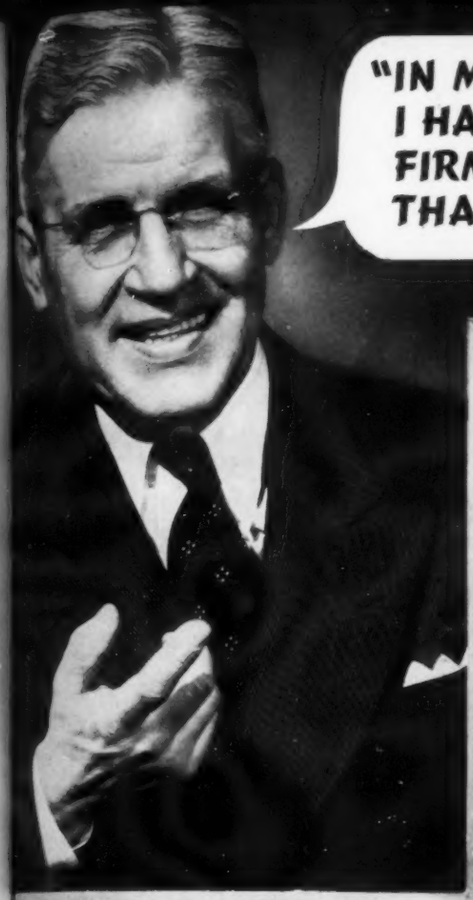
A. An ordinary cable saw may be used for this purpose though we prefer to use a length of piano wire. This wire need be only a few inches long and should have loops formed on each end. Heavy cord or small wire should be attached to these loops. The piano wire should be placed over the end of the lead sleeve with one of the cords through it. The piano wire then splits the sleeve as it is drawn through it by the cords. This is quicker and makes a smoother job than when a sleeve is split with a saw. The cutting wire may also be guided by pulling a certain way in order that the sleeve may be cut along a line drawn for the purpose.

Q. Is joint sealing compound ordinarily considered necessary for use with Fibre and Asbestos-cement conduit when used on telephone work?

A. The joints in these types of conduit are machined accurately and are tapered so that ordinarily the use of compound will not be considered necessary. However, compound costs very little and its use is often recommended by telephone engineers. A very small opening in a conduit joint will permit an infilteration of water which may carry enough silt with it to block the duct to such an extent as to interfere with cable changing operations later. Also a very small opening may permit the entrance of tree roots which may grow to such an extent as to cause injury to both the conduit and cable.

Q. Our exchange has increased in size to such an extent, that in connection with a cable change we are forced to install a cable vault. The basement under the main frame location is at the present unexcavated. We have our choice of either installing a regular cable vault or a special office manhole just outside the building. We would be pleased to have your advice as to which would be considered best. Also if a vault is installed should a stairway be constructed from the office proper to provide a means of entering it?

A. We would recommend that a regulation type cable vault be constructed directly beneath the main frame in the unexcavated section of the basement. While a stairway would no doubt prove a convenience we doubt that the cost would be justified. Entrance to the vault may be had through a trap door in the floor and a suitable ladder. We prefer that permanent lighting be installed in a cable vault so that splicers will not be required to use extension cords when working in them. The office manhole located just outside the building could be used, however, it would necessitate the use of longer lengths of silk and cotton insulated cable. Also if the office manhole is used it would also probably be necessary to extend iron conduits from it to each section of the main frame to insure a good job, and this would probably prove rather expensive. While it is true that a cable vault is used very little by workmen after the cables are installed, however, we are of the opinion that it should be of proper size, clean on short notice if it becomes necessary and dry in order that it may be used to make cable repairs or changes.



"IN MY ENTIRE BUSINESS CAREER I HAVE NEVER FOUND A BETTER FIRM TO BUY SUPPLIES FROM THAN STROMBERG-CARLSON"

UNQUESTIONED QUALITY AND DEPENDABILITY KEYNOTE STROMBERG-CARLSON SUPPLIES

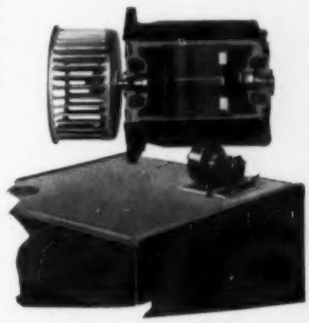
Stromberg-Carlson is just as particular about the quality of the supplies it sells as it is about the quality of the equipment it manufactures. Before being stocked by Stromberg-Carlson, all supplies must meet exacting tests to insure their ability to give long, uninterrupted service. That is why so many telephone companies make Stromberg-Carlson their jobber.

STURGIS POSTURE CHAIRS

These metal chairs are designed to insure correct posture on the part of the operator. As a result, she works with less fatigue. A wide choice of backs and seats is offered. Many colors in both enamel and leather. *Distributed exclusively by Stromberg-Carlson.*

BON-AIR TELEPHONE BOOTH VENTILATOR

Keeps fresh air constantly in motion in the telephone booth. Mounted out of sight, on the top of the booth and at the rear. Starts automatically when the door switch is closed. Fiber fins supply air to the interior. Requires only a 25-watt input. *Distributed exclusively by Stromberg-Carlson.*



HABIRSHAW WIRE

Habirshaw Ecco Brand Telephone Wire is supplied in many sizes of the following types: Bronze Drop Wire, Bridle Wire, Pothead Wire, Interior Wire and Jumper Wire. *Distributed exclusively by Stromberg-Carlson.*

Stromberg-Carlson Telephone Mfg. Co., Factory & Gen'l Offices: 100 Carlson Rd. Rochester, N. Y. Branch Offices: Chicago, Kansas City, San Francisco, Toronto

No. 7 Cook Lightning and High Voltage Arresters

protection against lightning entering cable subscribers' drops or open leads. Capacity: pres. Back and base of a single piece of heavy hot galvanized. Insulation and fanning strip olded phenol compound. 7½ x 3¾ x 2¼ s. Weight 2½ lbs.

Reliable RU Unprotected Terminal

Capacity	Ship. Wgt., Lbs.	
	Less Stub	With Stub
11 pr.....	10½	15½
16 pr.....	12¾	19
26 pr.....	18¼	25

Eveready Columbia Gray Label Long Life Telephone Cell

Especially designed for telephone work and light drain service—2 or 3 for a standard magneto telephone. Voltage: 1½; Diameter: 2½ in.; Height: 6 in. Standard package: 25; Shipping Weight: 57 lbs.

Everstick Expanding Anchors

An ideal guy anchor for all-round use—built to hold strains 100% greater than rated holding power of ordinary soils. Furnished in 2-way, 3-way and 4-way types. (3-way type illustrated.)

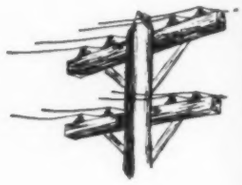
Crapo Double Galvanized Telephone and Telegraph Wire

Drawn from special steel and double galvanized. Has heavy zinc coating offering maximum resistance to corrosion. Can be wrapped in its own diameter without cracking, flaking or peeling. Guaranteed to conform to all standard specifications.

Stromberg-Carlson

MAKERS OF VOICE TRANSMISSION AND VOICE RECEPTION APPARATUS FOR FORTY-FIVE YEARS

LONG LINES



R. A. Clark, Jr.

Emergency Radio Communication Medium Frequency Group

AS mentioned in one of the preceding articles, the Federal Communications Commission has assigned three radio frequencies for voice communication and one for telegraph. The voice communication frequencies are 2292 KC, 2726 KC and 4637.5 KC. The frequency assigned for telegraph use is 3190 KC. The medium frequency group does not depend on sky wave radiation and should be engineered on the basis of the ground wave only which can be predicted with reasonable accuracy. The sky wave radiation at 2292 and 2726 KC is negligible during the daytime, however after sunset it becomes appreciable and may improve transmission or decrease it depending on the phase angle. There is an appreciable sky wave radiation at 4637.5 KC during the daytime and may be taken advantage of.

The Medium Frequency assignments will be found most useful for those companies which operate in mountainous or hilly territory, because of the reflection characteristics of the Ultra-High Frequency assignments. However, a compromise sometimes is the best solution to a problem concerning radio transmission. Emergency communication to mobile units in a public utility system generally does not require communication while the truck or car is in motion. The equipment however, should be portable and be readily set up. If it conforms to these requirements, we will have good success with the Medium Frequency assignments. If a truck or car is equipped with a portable transmitter and receiver operating from a storage battery, no serious inconvenience should be experienced by making it necessary for the truck to stop and erect a light aluminum pole in an appropriate socket provided for the purpose on the side of the truck when it is desired to transmit. The receiver would operate whether the truck is in motion or stationary. By making a compromise of this nature, we gain the advantages offered by the dependable ground wave radiation of the Medium Frequency waves in territory located in mountainous country where Ultra-High Frequency radiation is of limited and uncertain performance.

The performance of Medium Frequency bands can be calculated with reasonable accuracy. The field strength required for satisfactory communication depends on several factors the important of which are the receiver characteristics, the receiving antenna and the local noise level. Usually the noise level is of most importance and field tests should preferably be made in advance of the design calculations. In many instances a field strength of 10 micro-volts per meter will be sufficient for satisfactory communication between two fixed stations. On mobile receivers a field strength of 50 micro-volts per meter is desirable. As many power people know and also as proven by the airlines, it is possible to communicate when the noise level very nearly approaches the intensity of the received signal. This condition is obviously undesirable for normal operation but can be taken into consideration when power considerations are a factor.

THE method of calculating field strengths and the curve shown were

Fig. 1—Ground conductivity in Central and Eastern United States.

8 OPERATING HOURS FOR ONLY 1¢

that's what you get with each "EVEREADY" "AIR CELL" INSTALLATION!

GUARANTEED *in writing* TO DELIVER 6,000 HOURS OF SUSTAINED VOLTAGE AT PEAK TRANSMISSION EFFICIENCY

An "Eveready" "Air Cell" installation consists of 1 No. T-2600 and 1 No. T-1600

Today—more than ever—telephone management is constantly seeking ways of cutting operating costs...and improving the quality of service.

That is precisely what an "Eveready" "Air Cell" installation does!

It reduces the power cost of your Operators' Transmitters to ⅛ of a cent per talking or working hour... and because its voltage is sustained for 6,000 hours—at the proper level for peak transmission efficiency—improved quality of service results!

These guaranteed (in writing) batteries may be obtained from all principal telephone supply jobbers.

NATIONAL CARBON COMPANY, INC.

specifically

GUARANTEES

that the "Eveready" "Air Cell" Telephone Operators' Transmitter Batteries, Nos. T-2600 and T-1600—when used in the telephone service for which they are designed and in connection with transmitters of modern design, and when properly installed and maintained according to directions provided therewith—will deliver a minimum of 6,000 hours at peak transmission efficiency.

NATIONAL CARBON COMPANY, INC.

GENERAL OFFICES: NEW YORK, N. Y. • *BRANCHES:* CHICAGO • SAN FRANCISCO

UNIT OF UNION CARBIDE UCC *AND CARBON CORPORATION*

NATIONAL CARBON CO., INC.

General Offices: New York, N. Y.

Branches: Chicago and San Francisco

Unit of Union Carbide UCC *and Carbon Corporation*

The words "Eveready" and "Air Cell" are trademarks of National Carbon Company, Inc.

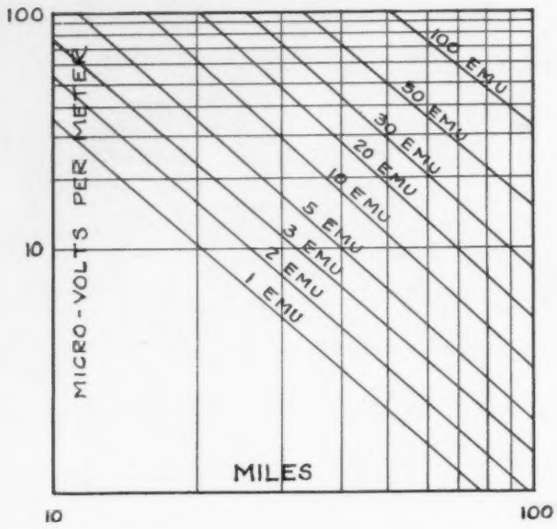


Fig. 2—Field strength of 50 watt station, 2292 kc.

based on a paper presented by K. A. Norton in the October, 1936 Proceedings of the .Institute of Radio Engineers The field strength is primarily a function of the ground conductivity. Fig. 1 is a map showing the ground conductivity in the central and eastern part of the United States; this is based on data prepared by the Federal Communications Commission. Fig. 2 shows the field intensity at varying distances from the transmitter for different values of earth conductivity. This curve is calculated for a 50 watt transmitter using a one-quarter vertical antenna and operating on 2292 KC. If a one-half wave vertical antenna is used, the field strength value should be multiplied by 1.3. The other power outputs the field strength should be multiplied by the square root of the power ratio. For example, assume it is desired to determine the range of a 50 watt transmitter in Illinois, a 50 micro-volt per metter signal required. From Fig. 1 we note that the ground conductivity is 15. Following along the conductivity curves we note that a field strength of 50 micro-volt per meter will occur at a distance of about 29 miles from the transmitter.

With the frequency under consideration a sky wave field intensity will undoubtedly become apparent at distances beyond about 40 to 50 miles. At 2292, 2726, and 3190 kilocycles the sky-wave field intensity is usually much greater at night than during the day while at 4637.5 kilocycles the sky wave field intensity plyas an important part both day and night. As a result of this condition it may be stated that, in general, the night range of frequencies from 2292 to 3190 KKC, both the day and night range may be from three to six times that shown for the ground wave only.

"Tapping In" on Washington

(Continued from page 18)

in the case of handling Independent toll traffic in three situations of Bell System and Independent competitive territory is salted to be discarded as the three Bell companies—the Bell of Pa., New Jersey Bell and Southern Bell—have revised their tariffs on this service. The March 5 hearing was continued until April 9 so the FCC could ascertain if the revisions were satisfactory . . . The Temporary National Economic Committee — headed by Senator O'Mahoney — is going to delve into technological unemployment in the telephone industry resulting from dial service during the middle part of April and a leading A. T. & T. official is slated to take the witness stand; more than ten other industries also are to be scrutinized on technological unemployment. . . . The FCC has ordered a hearing on March 26 to determine whether the Lorain, Ohio, Telephone Co. should be refused exemption as a connecting carrier (Section 2-B-2) from the full provisions of the Communications Act because of its financial relationships with the Lorain County Radio Corporation which serves Great Lakes shipping with radiotelephone. The Lorain Telephone Co. has divested itself of all financial stock interests in the radiotelephone carrier, although the leading executives of the telephone company are now the stockholders in the radio corporation. . . . A hearing before the FCC is to be held March 28 on the acquisition by the Michigan Bell of a small independent, the Hillandale Telephone Co. in the Benton Harbor area. . . . The application of the Michigan Bell for the construction of four radiotelephone stations to serve Great lakes shipping in the Detroit harbor also was set for hearing.

(Turn to page 34)

"What do you mean 'Drop another nickel!' "

When you're in a spot, depend on your Western Electric telephone

In an emergency, just as in ordinary needs, the telephone stands by you. The care and skill of Western Electric workers is one important reason why your voice goes through quickly and clearly.

When you dial a call you may be using equipment which this Western Electric girl helped to make. She knows that unless her work is right, the telephone plant will not respond to your call.

Your voice is important to this man, as he skilfully forms a 5,310-wire switchboard cable. This attitude guides work in all our responsibilities—purchasing, manufacturing, distributing for the Bell System.

Western Electric *. . . made your* **BELL TELEPHONE**

Commissioner Walker Lauds Miraculous Improvements In Telephone Art

URGING that American communications should be kept free and untrammeled at all times "for the common good," FCC Commissioner Paul A. Walker in a recent address before the noted Commonwealth Club of San Francisco made a comprehensive exposition and review of all branches of communications and of the work of the Federal Communications Commission in which he lauded the progress of the telephone industry as having made developments and improvements approaching "the miraculous."

"Possibilities of development and improvement in telephone systems and services seem limitless," Commissioner Walker stated. "They all point to greater speed, greater carrying capacity and more diversified and universally distributed service at reduced costs."

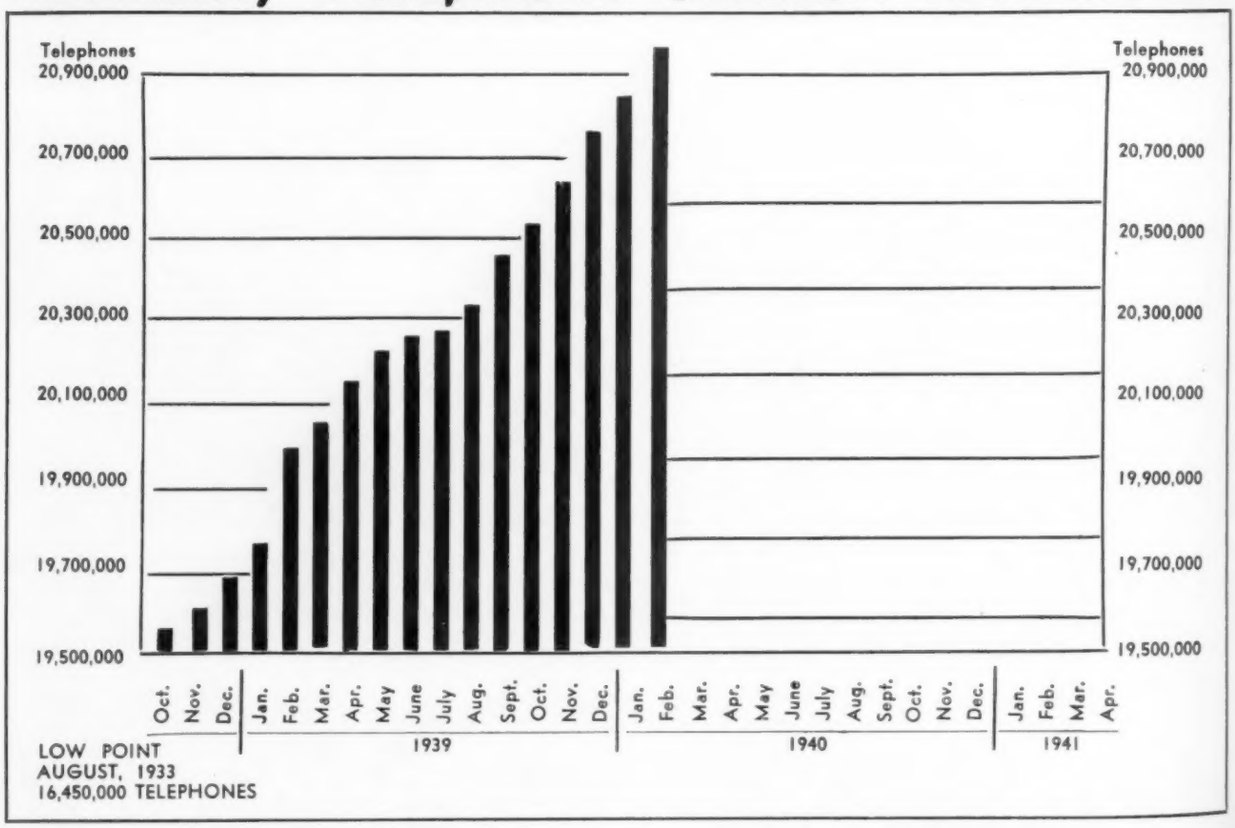
Declaring that the telegraph "has played a most important part in our national life and our consciousness of national unity," Commissioner Walker reviewed the progress of the domestic and international telegraphic services and pointed out that prior to the world war telegraph communications were largely of a business character but through recent new classifications the general public has learned to use this service for social purposes to an increasing degree. He noted that "competition has been most severe upon telegraph companies, both domestic and international." In the international telegraph field, he cited that radiotelegraph "has grown to large proportions and has become a most serious competitor with transoceanic cables."

A considerable portion of Commissioner Walker's interesting analysis and description of the various fields of communication was devoted to the different branches of radio and in regard to broadcasting the highlight was the definite pronouncement that the FCC is prohibited by law from censorship of broadcast material and would avoid it as a wise policy of operation "were there on inhibition against it." Stressing that broadcasting stations should give a worthwhile service and should expect Commission scrutiny when they violate the law or public interest in programs promoting lotteries, fraudulent advertising or violating the sense of propriety of the listening public, Commissioner Walker said that personally he saw no reason why the FCC should not propose standards of programs which it might hope could be met by broadcasters who apply for licenses.

COMMISSIONER Walker in his description of the telephone service paid high tribute to the efficacy of that branch of communications in meeting great emergencies during storms and disasters. He cited how rapidly telephone service restoration was made following the 1938 New England hurricane and declared that "too much credit cannot be given for the organization, efficiency and devotion to public service revealed by these great emergencies." He also praised the work of the amateur radio operators in floods and disasters and pointed out that the telephone companies had established special emergency radiotelephone stations for use in such emergencies. He noted that if telephone service within any large metropolitan center should suddenly be wholly interrupted "the streets would scarcely hold the messengers who would instantly start rushing from place to place to attempt to carry on necessary communication."

Commissioner Walker pointed out that the date of his address—March 1—was within proximity to many important anniversaries in telephony. He cited the birth of Alexander Graham

Monthly Telephone Station Barometer



and now

An UNBREAKABLE INSULATOR

(ACTUAL SIZE)

This insulator answers the breakage problem from stones and bullets. Due to special features in design (Pat. Pending) the unit has low leakage loss during wet weather and will remain live and free from checks for many years. Available for immediate delivery.

Available for use on Western Union Steel pins only at present.

Price: Sample lots of 100—$8 per 100.

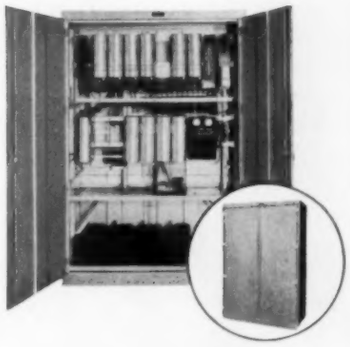
Communication Equipment & Engineering Company

504 N. Parkside Avenue

Tel. Estabrook 3110 Chicago, Illinois

PHILLIPS AUTOMATIC SWITCHING EQUIPMENT

The world-wide reputation for performance and durability of Strowger Automatic switching equipment is maintained in Canada by Phillips Electrical Works Limited. Phillips supplies Strowger switchboards to suit every public or private exchange. Whether your exchange is large or small, you can be sure of completely satisfactory performance and long term economy with Phillips equipment. The illustration shows a fifty line PABX switchboard.



Your wire, cord and cable problems, too, will be solved to your satisfaction if you tell them to the Phillips representative.

PHILLIPS ELECTRICAL WORKS LIMITED

TELEPHONE EQUIPMENT — ELECTRICAL CONDUCTORS

General Distributors

CANADIAN TELEPHONES & SUPPLIES LIMITED, 284 King Street West, Toronto, Canada

Montreal Brockville Winnipeg Regina Vancouver

Export Distributors

AUTOMATIC ELECTRIC SALES COMPANY, LIMITED

Chicago

SPLICER'S TOOLS

Of Top Quality by **UNIQUE**

- FURNACES
- SOLDER POTS
- BLOW TORCHES
- WIPING CLOTHS
- BALANCED LADLES
- SOLDER IRON HANDLES
- POLE BLEEDING TORCHES
- FOLDING SAFETY SHIELDS

Protect Public, Splicer, and Furnace. No. 50 C Shield shown here. Of 22 Ga. galvanized steel. Reinforced edges. 23"x17"x17". No. 50—four-sided with grate. No. 50 A—same without grate.

Your Jobber Has These Tools

UNIQUE MANUFACTURING CO., INC.
221 W. Walton St. — Chicago, Ill.

Gives a better understanding of the plant and engineering features of the industry as a whole.

✦

Second Edition
(January, 1940)

ALBERT'S
ELECTRICAL COMMUNICATION

A study of the various specialized phases of electrical communication as related to the usages of modern communication systems. Nearly one-third of the content has been entirely rewritten, and the remainder revised to incorporate recent advances. The main revision occurs in the chapters on Sound and Acoustics, Speech and Hearing, Electronics and Vacuum Tubes, Inductive Interference and Plant Protection, Electronic Applications in Wire Communication (especially the sections on Carriers and Repeaters), and Wireless Communication.

534 pages 6 by 9 $5.00

For sale by

TELEPHONE ENGINEER
7720 Sheridan Rd., Chicago, Ill.

Bell on March 3, 1847, and his first telephone patent on March 7, 1876, and the establishment of the first California telephone exchange in San Francisco on Feb. 17, 1878, and on Feb. 1, 1894, the beginning of activity and growth of the Independent telephone industry. He referred to the name of Charles A. Rolfe of California as the dean of Independent telephone men.

"Some idea of the growth of this industry may be had from the fact that in 1876 there were but 2,593 telephones in the United States," Commissioner Walker said, "as constrasted with 20,821,000 telephones on January 1, 1940." He noted that Washington, D. C., with 40.1 telephones per 100 population led the cities of the world and San Francisco with 38.5 per 100 population was second. In 1937 he cited there were 50,560 telephone systems, Bell, Independent and farm lines, with a total mileage of wire of 92,546,584 at the beginning of 1939. Approximately 50 per cent of the world's telephones are in the United States, he declared and the telephone industry is the third largest public utility.

THE FCC Commissioner told the Commonwealth Club about the ever-increasing speed of service in the telephone industry and recited how quickly long distance connections can be accomplished. He then gave a description of the coaxial cable and carrier systems, citing the advantages of the coaxial at some length and relating that studies had shown this system much cheaper than any other wire link with the same number of circuits, and its utility for providing "a vastly improved television service."

Commissioner Walker referred to the FCC Telephone Investigation and stated that the inquiry had developed "a vast amount of information which will be of inestimable practicable value in telephone regulation." He noted that the Investigation, directly or indirectly, had secured material rate reductions, but said it was fair to record there had been substantial reductions prior to the FCC. During the entire time when the various rate decreases were made the toll business of the American Telephone & Telegraph Co. "has continued to grow in volume with, of course, increasing revenues." He referred briefly to the rapid growth of the transoceanic radiotelephone service and to the development of the single side band transmission and to the development in coastal harbor radiotelephone service.

Commissioner Walker has introduced to the Commonwealth Club by Commissioner Ray C. Wakefield of the California Railroad Commission as one of the leaders in the field of public utility regulation.

I WONDER WHY SOMEONE DOESN'T INVENT

by Quizzicus

A small and comparatively cheap earth boring machine that may be operated by a flexible shaft from the winch of a constructon truck?

A platform type of elevated ladder that may be mounted on a construction truck and elevated by the winch line, for use in the repair of aerial cable and tree trimming?

A vacuum tube amplifier that may be used in connection with an exploring coil and receiver for locating cable trouble with a tone test set?

A compresson type sleeve to be used to splice the conductors in a cable to avoid usual twisted type?

A formed sheet metal case to house an outside type, weatherproof telephone?

A 1-bolt or boltless guy clamp for guy strand that will be easily installed and will hold better than the now common variety.

(Send in your ideas to appear in future issues)

Central Office Equipment Planning

(Continued from page 20)

The main frame protectors and terminal blocks should all be clearly stenciled in order that pairs may be quickly located. Some types of main frame protectors make use of tell-tale lamps and an alarm buzzer which sounds when heat coils blow. Jumper wires should all be run in an approved manner and never pulled tight. A few inches of slack left in a jumper will often permit pairs of lines to be changed without replacing jumpers. Extreme care should always be observed to make sure that all main frame connections are well soldered.

Ordinarily, a single silk and cotton insulated cable will be extended from the cable vault to each vertical of the main frame. This cable will be either a 100 or a 200 pair depending on the number of protectors per vertical frame being used. The use of a single cable on more than one vertical of main frame never makes a good job and should be avoided when possible. Main cables, 400 pair or larger, should be spliced to 100 or 200 pair cables in the vault and the smaller cables extended to the main frame protectors for termination.

The Relay Rack

The relay rack is usually mounted near the main frame and should have ample space on all sides for the convenience of workmen. Its location should also be selcted with a view to facilitating cabling to both the main frame and the switchboard. Most relay racks mount 200 or more line and cut-off relays on each bay or section. The smaller or minor type relays are sometimes used though, due to the small savings in cost and the additional maintenance usually required for this type of relay, its use is not generally recommended. The large or major type relay is generally considered more satisfactory and is in general recommended.

Trunk, toll, and other special equipment such as message registers are generally mounted on the relay rack. When a telephone company does not have regular switchboard installers and considers the installation of a multiple type switchboard, it is usually considered desirable to have all line and cut-off relays wired at the factory and this wiring terminated on suitable strips mounted near the top of each relay bay. When this practice is followed and short multiple cables are procured ready made, the installation of such a switchboard is a comparatively easy task. The long multiple cables are then merely spliced to the short multiple and extended to the terminal strips on the relay rack. These terminal strips also

SAF-T-FAX
By Hall
YOU CAN BOIL WATER IN A PAPER SACK OVER AN OPEN FLAME.
WATER IS SELDOM "IN THE BAG" TO REMOVE THE HEAT FROM HALF BURNED MATCHES AND FLIPPED CIGARETTES THAT START SO MANY EXPENSIVE AND DISASTROUS FIRES.
A "CIG" IN THE HAND IS WORTH TWO IN THE PLUSH!

make a convenient point for the doubling of the cables for extension to the main frame on an associated answering jack type switchboard. Each bay of the relay rack should also be equipped with necessary fuses and a fuse alarm to sound when a fuse blows.

Power Panel and Auxiliary Equipment

THE power panel for a manual system need not ordinarily be large. An extra bay of the relay rack may often

FOR QUICKER EASIER TRIMMING WORK
use
SEYMOUR SMITH
TOOLS...
TREE TRIMMERS
POLE SAWS
BRUSH CUTTERS
CABLE CUTTERS
JOINTED TEST-PIKE POLES
A line of tools designed for linemen's use that are standard equipment with the world's largest Utility Companies.
Send for folder and prices of this labor saving equipment.
SEYMOUR SMITH & SON, Inc.
321 Main St., Oakville, Connecticut

IF YOU WANT TO BE A

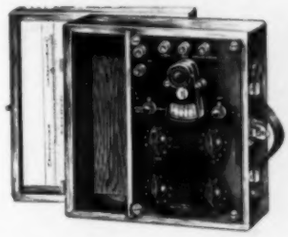
Fault-finder

BE A GOOD ONE!

USE THE NEW

SHALLCROSS

FAULT LOCATION BRIDGE



Here's an inexpensive, well-constructed instrument that reduces the maintenance cost of communication lines (telephone, telegraph or signal) by *simplifying* the job of locating trouble.

Presents a new idea in cablemens' fault location equipment.

The "Fault Location Chart" supplied with each instrument reduces calculating and distance determination to an absolute minimum. Makes ridiculously easy the frequently necessary job of finding grounds, opens, crosses, shorts, etc. Designed by a telephone engineer. Requires no special skill on the part of the user.

Write today for Bulletin No. 627.

SHALLCROSS MFG. CO.

Instruments – Resistors – Switches

COLLINGDALE, PA.

When you buy HOISTS check the extra features of . . .

The CHANCE PULLEY BLOCK and the TIPS TUGGER

The Capstan Pulley Block is light weight, easy to operate, and has a leverage ratio of 32 to 1. It is easily carried up poles, trees, ladders, etc. Has ratchet handle operation. Write for complete details.

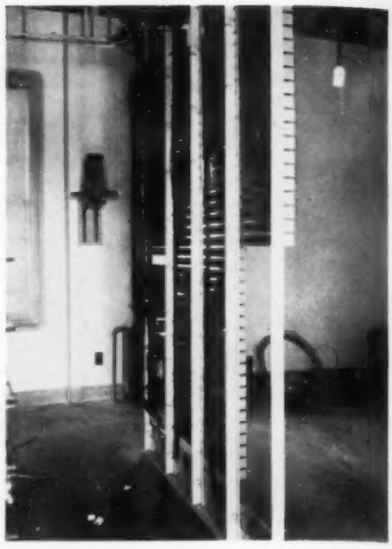
The Tips tugger is a spur geared puller with ratchet handle, friction brake, and "free wheeling." It will pull at any angle without binding the chain. 43 pounds on the lever will lift ¾ ton. Working parts are fully enclosed and packed in grease. Write or ask your jobber for more information.

A·B·CHANCE CO. CENTRALIA MISSOURI

be used for this purpose with complete satisfaction and the arrangement is both neat and attractive. The power panel should be equipped with a voltmeter and an ammeter to indicate both charge and discharge. Suitable fuses should be provided for the alternating current power supply, also the charge and discharge circuits. Switches should be provide to control the power supply and the charging and ringing machines.

Rectifiers will usually prove satisfactory for the charging of the storage battery on manual systems when the use of this type equipment is desired. These rectifiers may ordinarily be mounted on the power panel which makes a neat arrangement and simplifies wiring. When ringing interrupters are used, they may also be mounted on either the front or rear of the same power panel. A good arrangement is to have one interrupter operate from alternating current and one from the storage battery. When the commercial power fails a simple relay may be used to start the battery operated converter and switch its output to the ringing leads of the switchboard. When the commercial power is restored, the machines are again switched back to normal operation automatically. An extra set of contacts on the special relay may also be used to control a lamp used as an emergency battery operated light over the switchboard. This arrangement eliminates the necessity of the night operator looking for a match and candle when the power fails during a storm late at night and numerous subscribers are attempting to make rush telephone calls.

With this power arrangement, the wiring is a simple matter. Ringing and battery leads must be extended from the power panel to the switchboard and suitable leads to the storage battery.



Rear view of a modern relay rack with power panel on far end.

The commercial alternating current power must also be brought to the power panel. The wiring for the commercial power and the battery loops are usually run in conduit and the wiring from the power panel to the switchboard may be conveniently run on an overhead rack. Rubber covered braid wire may be laced to the rack for the battery, but the ringing generator leads should be shielded with a metallic covering. A lead covered cable or BX should usually prove suitable for this purpose. Iron conduits may be used to carry the power and generator leads from the power panel to the switchboard, but this usually proves rather unsightly unless the conduits are imbedded in the structure during the construction of the building.

(To Be Concluded Next Month)

It's Odd But True

Neither ice, snow, sleet nor rain are feared on this highway near Elko, Nevada. These pictures snapped on July 31, 1940, by Fred Heavens, Lorain Products Co., Lorain, Ohio shows definitely that a "bug-a-boo" can definitely be connected to bugs.

(Editor's Note—Perhaps you know of something Odd—but True—send it in.)

B. L. Fisher Invents Telephone Noise Suppression System

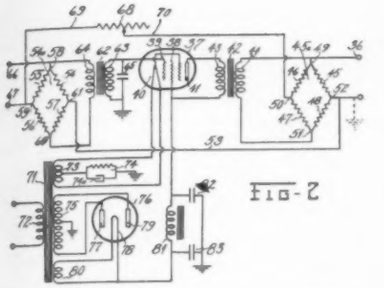


Fig-2

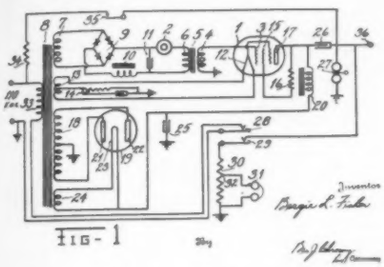


Fig-1

A method to provide a relatively inexpensive noise suppression system for telephone lines, particularly for open wire ground return lines in rural communities affected by power induction and static disturbances, is described in a patent recently issued to President B. L. Fisher of the Lee Telephone Co. of Martinsville, Va. Mr. Fisher is a prominent independent telephone man having served as president of the United States Independent Telephone Association and now a director and executive committee member of the Association.

Mr. Fisher's invention is also applicable to metallic trunk lines between exchanges, where the length of the line is comparatively short, and will provide a noise suppression system for telephone lines adapted to utilize the commercial alternating current as a source of power. It also will provide a noise suppression system, according to Mr. Fisher's description, for telephone lines adapted to impress the voice currents upon the telephone line at high transmission levels to obtain a high voice to noise ratio without the use of circuits that produce troublesome sustained oscillations. It also will permit the employment of the system with a high gain amplifier tube energized from a commercial lighting circuit and for use on a telephone line employing a vacuum tube amplifier which is connected to a telephone circuit through a resistance network. It also can be used for connecting a telephone line employing high signal to noise transmission levels to a line employing conventional low level signal transmission.

In describing the object of his new device which was awarded patent Number 2,191,375, Mr. Fisher declared:

"In accordance with this invention I provide an arrangement for the suppression of noise in telephone lines particularly the open wire ground return type of telephone lines and also in telephone circuits employing comparatively short trunk lines between exchanges. The apparatus of my invention is comparatively simple, reliable in operation and inexpensive which makes it feasible for use in rural communities where telephone lines are affected by power induction and static disturbances. The telephone set employed in accordance with this invention is provided with one or more amplifier tubes having the microphone or transmitter connected to the input and the telephone line connected to the output for amplifying the signal from the microphone to a relatively high level prior to impressing the signal on the telephone line. Where one tube is employed in the amplifier I prefer to use the pentode type although of course any other type of amplifier tube may

Manufacturers of Timing Equipment for over 25 years.

We know our products are dependable and accurate.

Therefore we **unconditionally** guarantee all of our devices.

THE DORSON CORP.
605 Washington Blvd.
Chicago Illinois

. . . and can they
"TAKE IT!"
MR. PURCHASING AGENT
TIME alone will tell you what a wonderful "buy" you've made — when you invest in a pair of Vacuum Grip Bolt Cutters. They're built to "take it"—and to keep on taking it! Massive construction. Battleship resistance. Power plus DURABILITY. The stamina that means LONG LIFE! Six types of blade assemblies, interchangeable in a jiffy, for every requirement.
VACUUM GRIP BOLT CUTTER — LINEMAN'S SPECIAL
No. 118-Legnth 18". Cutting capacity 3/8", equal to 24" in other makes. With side-cut blades (as illustrated) complete $5.00; center-cut blades $5.25; end-cut, diagonal-cut or end-cut nut splitter blades $5.50. Also furnished in 14", 24" and 36" lengths.
Make running tests at our risk. Write for details.
Made by the FORGED STEEL PRODUCTS CO. Newport, Pa. — and made RIGHT!
Vacuum Grip Pliers
OVER A MILLION AND A QUARTER IN USE

DROP WIRE

No. 17 TWISTED PAIR BRONZE OR COPPERWELD

Net Prices Delivered to Any Point in	New York Pennsylvania	Indiana Michigan Ohio	Illinois Kentucky North Carolina Wisconsin	Ala., Ia., Tenn., Calif., Minn., Tex. Fla., Mo., Ga., S. C.	Arkansas Kansas Nebraska Oklahoma
5000 FEET	$13.70	$13.95	$14.01	$14.19	$14.39
250.0 FEET	12.90	13.15	13.21	13.39	13.59
100000 FEET	11.70	11.95	12.01	12.19	12.39

ACORN INSULATED WIRE COMPANY
225 King Street - Brooklyn, New York
Telephone Cumberland 6-7200

CLIP OUT AND MAIL

Ship ..... coils of Drop Twist to the ..... Telephone Company located at ..... Ordered by .....

Distributor Selection for Billing — For Ohio: LINDSAY SUPPLY COMPANY, Cleveland ☐ Other States: LEICH SALES CORPORATION, Chicago ☐

be used as will appear from the specifications. The amplifier tube is suitably coupled to the telephone line and a rectifying tube device for rectifying the alternating current derived from the conventional lighting circuit is used to energize the plate circuit of the amplifier."

Under this new system, the signal is transmitted over the telephone line to the receiver where it is reproduced, and while, it is not necessary to equip every telephone line of an exchange with this system, it is intended that all telephones on a line so equipped would use this system or one substantially the same, because a telephone utilizing this construction will not operate with one that is not equipped with this or a similar method of noise suppression. A telephone line employing this high gain type of set may be coupled to a line employing conventional telephone sets through a noise suppressor circuit, which also forms a feature of Mr. Fisher's invention.

Suttle Loud Ringing Extension Bell

This is an excellent bell for solving the needs of the subscriber in the garage, lumber yard, print shop, machine shop, or such place, who needs an extra loud telephone signal.

It is an all-metal outfit with deep-skirted, specially tempered six-inch gongs. Equipped with a special heavy duty ringer movement wound for either 1000 ohms or 1600 ohms.

Cat. No. 199—Wound for either ohms, weighs 13 lbs., each . . . $7.25

"It Pays to Read Suttle Catalogs!"

SUTTLE EQUIPMENT CO.
LAWRENCEVILLE, ILLINOIS

Get Rid of Noise!
with the Improved
VINCENT RARE GAS RELAY

Installed in a Minute
No Moving Parts
Thousands in Service
Fully Guaranteed

Eliminates unbalance noises in metallic party lines employing divided ringing to ground. Works with either harmonic or code ringing.

Write for Catalog 39-A describing
Non-Grounding Rare Gas Arresters
Terminal Strips _ Potheads Housings

L. S. BRACH Mfg. Corp.
55-63 Dickerson St. Newark, N. J.
Signal Circuit Engineers Since 1906

TELERING
Only ONE Contact!
Price $44.00
F. O. B. factory

For better and cheaper ringing.
No Radio Interference
30-day free trial
TELKOR, Inc.
ELYRIA, OHIO

United Utilities Elects Officers

At the annual meeting of United Utilities, Incorporated held in Abilene, Kansas on March 4, 1940 the stockholders chose the following directors for the ensuing year:

Alden L. Hart, Los Angeles, California; William Ritchie, Omaha, Nebraska; Ralph W. Dockstader, Beloit, Kansas; Clayton E. Kline, Topeka, Kansas; L. W. Howell, Kansas City, Missouri; Clyde L. Paul, Philadelphia, Pennsylvania; R. B. Fegan, Junction City, Kansas.

Following their election the directors met for organization of the Board and designated officers as listed below:

(Elected): President Alden L. Hart; Chairman of Board, William Ritchie; Vice-President, Ralph W. Dockstader; Secretary, M. C. Beamer; Treasurer & Vice-President, C. A. Scupin.

Mr. B. I. Litowich, an attorney of Salina, Kansas, was appointed General Counsel for the company. Mr. Hart is now in active charge of the affairs of the company with headquarters at Abilene.

Obituary

Mrs. Esther Hess Henning, 50, died January 30, in Holbrook, Arizona, where she has been president of the Navajo-Apache Telephone System, Inc., for the past 9 years. She is survived by her husband, Lloyd C. Henning, vice president and general manager of the company, a son and a daughter. Mrs. Mrs. Henning had lived in Holbrook since 1909 and was continuously active in civic affairs there. She served on the child welfare board from its inception until it was dissolved, and on the Navajo county board of social security and public welfare since 1936.

William Charles Payne, 44, of Dallas, Texas, electrical engineer for the Southwestern Bell Telephone Company there for twenty-three years, died Feb. 15.

A. H. Griswold

COLONEL A. H. Griswold, 60, vice president and director of the International Telephone and Telegraph Corporation and formerly a prominent executive in the Bell System and in the Postal System, died at New York Hospital Saturday, February 24 after a short illness.

Colonel Griswold's whole career was outstanding in the communication services of this country: telephone, telegraph, radio and the Signal Corps of the Army. In telephone manufacturing and supply, he started with the Western Electric Company and after the War he became assistant chief engineer of the International Western Electric Co. in charge of engineering matters in Europe. In the telephone operations field, he became Assistant Vice President of the American Telephone and Telegraph Company, then operating Vice President on the Pacific Telephone and Telegraph Company which is the second largest Bell System Company, and at the time of his death he was Vice President in charge of all the telephone operating subsidiaries of the International Telephone and Telegraph Corp. throughout the world. In radio broadcasting, he had a major part in engineering and building the original Station WEAF which was built during his time as Assistant Vice President of the A. T. & T. and later sold to the Radio Corporation of America. With the Army as Major and Lieutenant Colonel, he became Director of the long distance telephone lines of the A.E.F. in France and then Director of all telephone and telegraph services of the A.E.F. In the telegraph field, he was Executive Vice President of the Postal Telegraph system for ten years.

Station Report

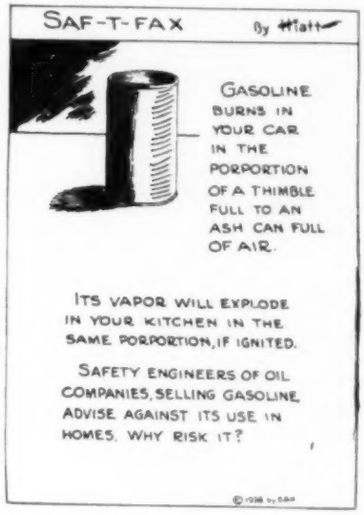
American Telephone & Telegraph Company reports a gain of about 82,900 telephones in service in principal subsidiaries in February, 1940. This compares with a gain of 94,700 in January and a gain of 68,000 in January 1937.

The net gain for the first two months was 177,600 phones compared with 133,300 in the 1939 period.

General Reports Station Gain

General Telephone Corporation reports for its subsidiaries a gain of 2,698 company-owned telephones for the month of February, 1940 as compared with a gain of 1,924 telephones for the month of February, 1939. The gain for the first two months of 1940 totals 5,086 or 1.01% as compared with a gain of 2,741 telephones or .60% for the corresponding period of 1939.

The subsidiaries now have in operation 506,670 company-owned telephones.


SAF-T-FAX
By Hatt
GASOLINE BURNS IN YOUR CAR IN THE PORPORTION OF A THIMBLE FULL TO AN ASH CAN FULL OF AIR.
ITS VAPOR WILL EXPLODE IN YOUR KITCHEN IN THE SAME PORPORTION, IF IGNITED.
SAFETY ENGINEERS OF OIL COMPANIES, SELLING GASOLINE, ADVISE AGAINST ITS USE IN HOMES. WHY RISK IT?

Files a Suit Asking Phone

Fort Dodge, Ia.—E. E. Gilchrist, owner of two beauty establishments here and a 440-acre farm near Otho, Ia., Monday began action in Webster county district court for a writ of mandamus to compel the Fort Dodge Telephone Co., to install a telephone in his farm home.

Gilchrist said the company removed his farm telephone Feb. 6, notifying him it was discontinuing the service as unprofitable. He contends the telephone is necessary in the operation of his business and farm. Hearing on the mandamus petition will be Feb. 29.

Poles On Private Land Bring 5½c

According to a press report, the Japan Ministry of Communications will pay an annual rental of 20 sen (5½ cents) for each of its telephone and telegraph poles erected on privately owned land. A bill to that effect, revising the Telegraph and Telephone Lines Law of 1890 which provides an annual payment of 4 sen (1 cent) per pole, will be introduced at the next session of the Diet. Of the 4,820,000 poles in the communication system, about 3,720,000 are erected on privately owned land, although at present rental payments are made on only 740,000 poles. An annual appropriation of 130,000 yen ($36,000) is made for this purpose by the Ministry.

DEPEND ON

Pole Line Hardware

Trim construction . . . extra years of trouble-free service . . . you can depend on *both* when you specify L-M Pole Line Hardware and Telephone Construction Specialties. Back of every L-M hardware item and specialty you buy is the L-M record of 30 years of dependable service to America's great electrical utilities. Place your order for L-M hardware with our national distributor, the American Automatic Electric Sales Company.

LINE MATERIAL CO.
REPRESENTED BY
AMERICAN AUTOMATIC ELECTRIC SALES COMPANY

"Reliable"
One-Piece

No. 955
STATION
PROTECTOR

● This one-piece Station Protector materially simplifies mounting and eliminates all need for asbestos mats. Connections are conveniently executed on heavy binding posts with studs treated to withstand corrosion. Equipped with *"Reliable"* self-cleaning sawtooth discharge blocks and *"Reliable"* No. 55 or No. 77 fuses as specified.

Samples on request

Reliable
ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES
3145 CARROLL AVENUE · CHICAGO, ILLINOIS

REA Cooperating in Interference Controversy

Considerable progress is being made by the Rural Electrification Administration in the solution of the problems of inductive interference with grounded telephone lines by their electric power projects, REA officials have asserted in Washington. There has been a clearer formulation of the REA telephone coordination policy and a closer cooperation between REA project officials and the Independent telephone companies, it was said.

Efforts are now being made, according to the REA, to route the power lines of cooperative projects so as to avoid wherever possible the paralleling of the grounded or earth-return telephone lines.

One of the most interesting developments in the past year has been the assignment by REA of two engineers with full time duties on telephone coordination problems. As a result of their work numerous tests of interference have been made in the field following complaints from the telephone companies. In some instances where the tests have indicated that installation of devices on the power lines would reduce interference these devices have been installed at the expense of the power cooperative. But in most cases it has been necessary to metallicize the telephone lines for the distance paralleled by the power wires to eliminate the interference.

The REA claimed that the Independent telephone companies where they have been required to metallicize their lines have found the improved service made it easier to obtain increased rates from their subscribers to pay the costs of those improvements.

Book Review

"Step Out and Sell" by William E. Holler

"Bill" Holler, as he is known to his friends and acquaintances, heads up the huge sales organization of the Chevrolet Division of General Motors, and has been responsible for selling $4,709,235,470 worth of new and used cars in the last six years.

To all in the sales field—"Step Out and Sell" will come as a refreshing stimulant. The book is only 96 pages long and consists of a series of short tonic man-to-man talks on the problems of selling today and in 1940.

Readers who expect to find an "I did it and I'll show you how" theme running through this book will be disappointed.. "Bill" Holler is just not that kind of an author! He has the happy knack of getting down to fundamentals and talking about them in a friendly, homey way that gets under the skin of both listener and reader. Price $1.50. Order through TELEPHONE ENGINEER.

Should Win Prize

Armour, S. D.
Feb. 26, 1940.

TELEPHONE ENGINEER,
Chicago.

Gentlemen:

I am enclosing a classified ad for your next issue.

I think TELEPHONE ENGINEER is the best magazine for telephone companies, because it helps out with everything in the telephone line.

Sincerely,
Frank Rada.

Kearney Corp. Elects Officers

James R. Kearney, Jr. James R. Kearney, Sr.

The Board of Directors of the James R. Kearney Corporation, St. Louis manufacturers of telephone line accessories and power line equipment, recently announced the appointment of James R. Kearney, Sr. as active chairman of the board of the company which bears his name, and James R. Kearney, Jr., a son, as president to fill the office which Mr. Kearney, Sr. vacated.

Walter A. Heinrich, one of the founders of the company, has been named executive vice president of the company and F. W. Kearney, another son, assumes the responsibilities of secretary.

The Kearney Corporation has been nationally recognized in the business world because of its sensational growth. The company was organized by Mr. Kearney, Sr., his son, James R. Kearney, Jr., and three others in 1926—with nothing—and has grown to an organization of several hundred people, doing an annual business of several million dollars.

The business was primarily started in order to place on the market certain products which Mr. Kearney felt would be acceptable to both telephone and power companies to improve service, obtain greater economies and provide greater safety.

Griffith to Head Copperweld Alloy Division

Mr. F. J. Griffith to head Copperweld Steel Company's New Alloy Steel Division at Warren, Ohio.

The appointment of Frederick J. Griffith as Executive Vice-President in charge of the newly-created Alloy Steel Division of Copperweld Steel Company was announced by President S. E. Bramer of the Company.

The appointment follows the earlier announcement by Mr. Bramer that the Copperweld Steel Company has purchased the plant and assets formerly owned by the American Iron Company at Warren, Ohio. On the 423 acre property will be erected a $2,000,000 steel plant including electric furnaces and other equipment capable of producing 100,000 tons of high quality alloy steel annually, part of which is to be used in the manufacture of Copperweld wire, rods, and strand of copper-covered steel. The present buildings of the American Puddled Iron Company will furnish only a nucleus for the new plant which when completed will spread over 285,000 square feet of floor space. The finishing operations now being carried on in the Copperweld Steel Company's plant at Glassport, Pa., will continue as usual.

New Nicopress Sleeve

The National Telephone Supply Company, after a long period of laboratory and field tests has designed and recently placed on the market a new Nicopress sleeve. This sleeve is intended to facilitate the work where it is necessary, for one reason or another to cut out and replace old splices. Its use eliminates the cutting in of new sections of wire, or re-sagging of the line.

With these Nicopress repair sleeves the job of splicing is very simple. And any lineman can quickly make workmanlike, neat strong splices.

The sleeves are slightly longer than the old cut-out joints, which they replace, and are divided by a groove into a short and a long section.

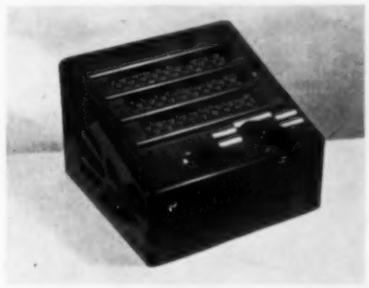
To make the repair splice with these Nicopress sleeves all that is necessary is to push one wire end into the short side of the sleeve and make two compressions, then push the other wire end into long side of sleeve, inserting it until the desired sag in line is obtained, and making two compressions.

For complete details address this publication or write The National Telephone Supply Company, 5100 Superior Avenue, Cleveland, Ohio.

Spending Program

Approximately $18,000,000 the largest program since 1931—will be spent by the American Telephone and Telegraph company in 1940 on "long distance" construction, officials of the company announced Feb. 20.

Telephone Maintainers, Salesmen, and Operating Companies —



Have you ever noticed how long it takes to communicate within organizations to individuals who are busy?

Can your customers afford to continue operating and wasting time when Two-Way Loud Speakers are so inexpensive?

All progressive organizations are giving consideration to Loud Speaking Telephones.

Investigate and prove this for yourself.

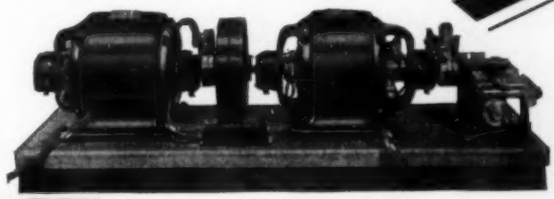
BANK'S MANUFACTURING COMPANY

5019 N. Winthrop Avenue
CHICAGO, ILL., U.S.A.

DUO-VOX TELEVOX INSTANTPHONE

"Licensed under Bank Patent No. 1922415"

Important!



HOLTZER-CABOT

- **RINGING MOTOR GENERATOR SET**
- It is of vital importance that a telephone exchange operate dependably without interruption. AT ALL TIMES.
- This is why Holtzer-Cabot ringing motor generators are designed and built to give a lifetime of continuous and dependable service.
- Holtzer-Cabot ringing motor generator equipment has the unqualified approval of the engineering and service departments of all major telephone companies.
- Our engineers will gladly confer with you. Their experience can be helpful — write for Bulletin 1310-02

THE HOLTZER-CABOT ELECTRIC CO.

125 Amory St. BOSTON, MASS. — *Motor Specialists* — 6161 S. State St. CHICAGO, ILL.

The Clearing House

For the convenience of readers of Telephone Engineer

THE NEW ELECTROX
Battery Eliminator Type PA-05004

$16.85

Complete with power-off relay. Output for two operators' sets. Mount; connect two leads to operator's terminal; plug in cord. Presto! no more battery problem! Sent on trial. Write for Cir. 373.

ELECTROX 2060-68 Reading Road
A Schauer Product CINCINNATI, OHIO

How to—
Wipe Perfect Joints
on lead-sheathed cable splices.
A post card for free instructions
George E. Williams
811 W. Lake St. Minneapolis, Minn.

FOR SALE

Western Electric and Kellogg Magneto Switchboards. These boards are all in excellent condition. If interested, state capacity and equipment required. The Southwestern States Telephone Company. Brownwood, Texas.

A SALES ORGANIZATION
Exclusively....

That Has Never Failed to Produce More Net Revenue for Telephone Companies Served, All Costs Considered.

IF INTERESTED in more net telephone directory revenue write or call at our expense.

LOOMIS ADVERTISING CO.

Telephone Bldg., Kansas City, Mo.
Citizens Trust Bldg., Ft. Wayne, Ind.
135 So. Second St., Philadelphia, Pa.

WANTED TO BUY a used earth boring machine. Am ready to pay cash. Box 8249, c/o TELEPHONE ENGINEER.

EMPLOYMENT WANTED by 35-year old, single man with 15 years experience repairing telephone equipment, line work and trouble shooting. Informed on magneto, common battery and dial systems. Owns some tools and testers. Box 8245, TELEPHONE ENGINEER.

WANTED — Executive type telephone plant man with broad experience in supervision of large plant operation; one who is thoroughly versed in all phases of telephone plant work and capable of taking complete charge of plant department operation of large-sized independent company. Give complete details as to qualifications and experience and attach small photograph. Box 8246, TELEPHONE ENGINEER.

Telephone Repair's at Money Saving Prices
Complete Shop Service

Transmitters completely rebuilt, Baked black enamel fronts, new granular carbon, @ **$.40c each**, less backs.

Receiver Repaired, Shells repolished, New Cords, Test and adjust, @ **50c each.**

New Shells @ **40c extra.**

Desk Stands Rebuilt, Metal parts refinished black baked enamel, New Cords, shells, felt on basis, @ **$3.00.**

Old Wall or Desks Sets Modernized, we supply new cabinets, cables, terminals, short arms, new cords, all metal parts refinished in black baked enamel. You receive complete set like new @ **$7.50 each.**

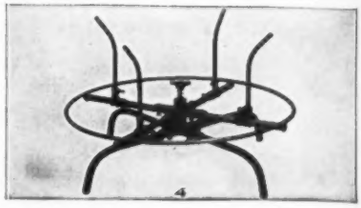
Old Wall sets or parts rebuilt into late type Wall Hand Sets, we supply New cabinets, Hand units, Hooks, Cables, Terminals. Complete sets @ **$13.50.**

Old Common Battery Wall or Desk Boxes rebuilt into late type Enclosed gong set, prices on request.

Independent Telephone Repair Company
1432 West 15th Street
Chicago, Ill.

Payout Reels

READY REELS



READY MFG. CO., Toledo, Ohio

Telephone Directories

Telephone Directory ADVERTISING
Write or telephone for proposition
L. M. BERRY & CO.
Call L.D. 16, Telephone Bldg., Dayton, O.

Telephone Engineers

J. G. WRAY & CO.
Telephone Engineers
Specialists in Appraisals, Rate Surveys, Financial Investigations, Organization and Operation of Telephone Companies
105 West Adams Street
CHICAGO

J. W. WOPAT
CONSULTING ENGINEER
Telephone Engineering — Construction Supervision — Appraisals — Financial — Rate Investigations
1510 Lincoln Bank Tower
Fort Wayne, Indiana

Cedar Poles

Carney
CEDAR POLES
Plain or Butt Treated
B. J. CARNEY & CO.
100 No. 7th St. Minneapolis

Finished Cedar Poles
VALENTINE CLARK CORPORATION
St. Paul, Minn.